THE CONDOR

A Magazine of Western Ornithology

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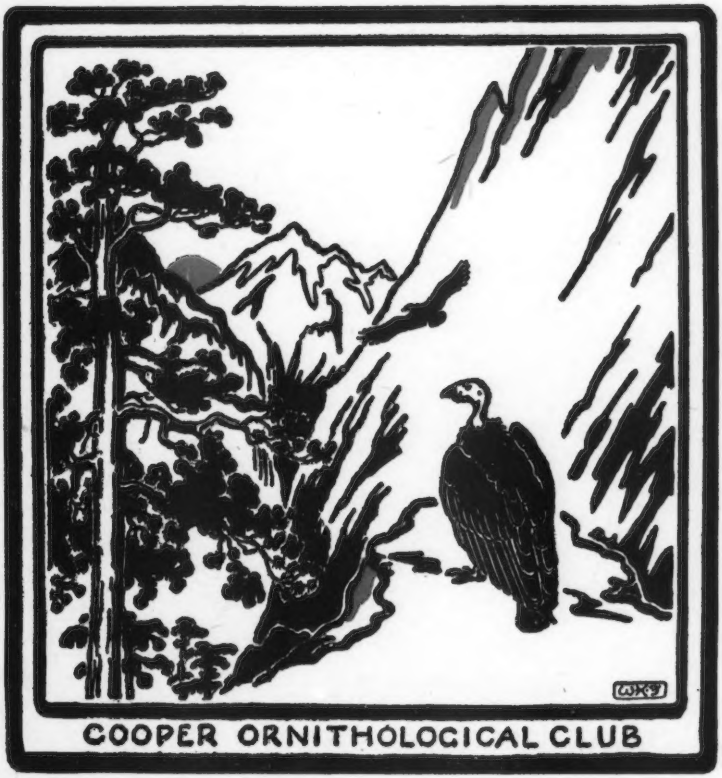

COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

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JOHN EUGENE LAW—A BIOGRAPHY

WITH PORTRAIT

By JOSEPH GRINNELL

John Eugene Law, son of John and Katherine E. Law, was born August 26, 1877, in Forest City, Iowa, and lived there until the age of 14. He attended high school in Perry, Iowa, 1892 to 1896; then he spent two years at the University of Wisconsin, Madison, going from there to Stanford University, California, where he received his A. B. in 1900. From 1900 to 1903 he was teller in the First National Bank of Pomona, California, from 1903 to 1911, cashier in the First National Bank of Hollywood, and from 1911 to 1914, president both of the First National Bank of Hollywood and of the Hollywood Savings Bank. In 1914 he retired from active business. After prolonged illness, his death occurred in Glendale, California, November 14, 1931, thus early in the 55th year of his age.

J. Eugene Law as a factor in western ornithology is the prime theme of this biography. For this is the rôle in which we of the Cooper Ornithological Club came to know him best—came to place high value upon his attainments and influence.

My own acquaintance with the subject of this biography began in 1897 when I received in Pasadena a postal card inquiry from "J. Eugene Law, 421 Lake, Madison, Wisc.", dated February 26, for skins of juncos and marsh sparrows. Negotiations proceeded, and I sold him 6 Thurber Juncos at 20 cents each and 6 Belding Marsh Sparrows at 35 cents each; and I received for them a Money Order for $3.30. Those very skins are still in the Law collection.

I first met Gene Law in person, in 1900 at Stanford University. We had two or three brief conversations about birds, but our interests otherwise were far apart, he having majored in law, while I was a graduate student in the department of zoology. We exchanged a few letters in 1902 and 1903, chiefly concerning Cooper Club affairs. By 1904, when he was well established in banking in Hollywood, and I in teaching at Throop Polytechnic Institute in Pasadena, correspondence and visits became frequent, our common interests being the collecting and study of birds and the promotion of the welfare of the Cooper Ornithological Club.

It was in his vigorous activities in the interests of the Cooper Club that Law rendered valuable aid to the spread of bird study in southern California. An indication of this is obtainable from the record of the offices he held, as follows: President of the Southern Division, 1905 and 1913 to 1915; vice-president, 1916 to 1917;

secretary, 1906 to 1912; business manager, 1907 to 1925; president, board of governors, 1925. He became a member of the Club in 1900, a life member in 1915, and was elected to honorary membership in 1929. In connection with this latter, highest tribute his associates in the Club could give him, the following sentences were included in the formal proposal which was filed with both the Northern and the Southern Division.

"In event of favorable action upon our proposal, we believe that the Club will thereby confer lasting recognition upon Mr. Law for the many years of loyal service that he has unselfishly given to the Club. Furthermore, in the interests of scientific ornithology, Mr. Law deserves the recognition by reason of the high standards of accuracy always shown by his published articles, as also because of his important contributions to methodology in the fields of bird banding and plumage study. On the other hand, by favorable action upon this proposal, the Club itself will gain by the addition of a worthy name to its Honorary Membership, already of distinguished constitution." His election carried unanimously in the Southern Division on March 26, 1929, in the Northern Division on March 28, 1929. Letters from him shortly afterward indicated his profound appreciation of the good will and esteem of his fellows thus expressed.

Referring again to his devotion to the interests of the Cooper Club, it was Gene Law who, in 1921, entirely revised the Constitution under which the Club is now governed. This was when he was in residence in Berkeley, so that I had opportunity of seeing with what extreme care he considerd every detail, exercising scrutiny from the standpoint of a business man and a lawyer, but at the same time heeding the prime purposes for which the Club was founded.

It was Gene Law, too, who introduced the idea of an Annual Meeting of the Cooper Club, similar in purpose to that of the A.O.U. He pointed out the impossibility of many of the western members ever getting East to the A.O.U. meetings, and he thought that by having a similar annual meeting here in the West, with formal presentation of papers, serious bird study would be furthered and the divisions of the Cooper Club would be brought more closely together. These ideas went out in the shape of a questionnaire to each member of the Board of Governors, in January, 1925. The plan was adopted, and the seven consecutive Annual Meetings of the Club have proven by their brilliant success the wisdom of the original proposal.

As early as 1897 Gene Law had become a collector. Throughout the subsequent years he continued to add to his privately owned collections relating especially to ornithology. He took vast pains in preparing and caring for the scientific specimens he collected. His bird-skins, feather-mounts, skeletons, eggs, labels, notebooks, catalogs, were all given the most careful attention, to make them permanent, neat, and accurate in all respects. His business training demonstrated its worth when it came to organizing the bird-banding data gathered by himself and Mrs. Law, and that which in later years went through his hands from other sources in quantity. Whatever he did was done well and with attention to niceties of detail that are attained by only a very few. In all these labors he received the ever sympathetic assistance of his capable wife, Laura Beatty Law. The two worked continually together, in field and laboratory, throughout the period of Gene's main scientific activity.

It was in 1919 that J. Eugene Law became connected with the California Museum of Vertebrate Zoology; and from then on, his curatorial acumen contributed not inconsiderably to the development of the "system" that characterizes that museum's methods of housing its materials. He served first as Curator in Osteology and latterly, up to the time of his death, as Curator in Ptilology. Although on

Fig. 20. JOHN EUGENE LAW, 1877-1931.

"dollar-a-year" basis, he contributed of his time and energy generously. He was in residence in Berkeley from time to time, but to far less extent than he had originally intended, because considerations of health made it increasingly the wisest course for him to reside in the south. The periods when he was present in the old M. V. Z. building on the University of California campus will ever be remembered by his older associates there for their pleasant social features. Then, too, the active participation of Mr. Law in the meetings of the Northern Division, C. O. C., by reading papers based upon his personal studies, and by engaging in the open discussions, marked a profitable and enjoyable era in that Division's history.

While, as I have emphasized, Law's direct contributions to published ornithology are altogether worthy as to originality and soundness of thought, the bulk of them would have been far greater had he not expended his energies so generously in other directions. The extent of the services that he gave to ornithology through the effective encouragement of others, and by accepting more than his share of the organization drudgery in the Cooper Ornithological Club and the Western Bird-banding Association, can hardly be comprehended save by the relatively few of us who happened to be in a position to know of and evaluate these services.

From a few sources through which I knew valuable light would be shed, I have elicited noteworthy testimony. The first of these sources is Mr. E. Lowell Sumner, Jr., who now holds the position of Research Assistant on the staff of the California Museum of Vertebrate Zoology. He is also a graduate student in the University of California. The following four paragraphs are direct from Mr. Sumner's own pen.

"Even one's most vivid impressions of a loved and revered personality are difficult to convert into words. This is particularly true of my remembrances of Mr. Law; for the inspiration which I derived from contact with him was of a peculiarly intangible sort. Perhaps the difficulty of translating my impressions arises from the fact that a great part of his influence was traceable to his own general attitude rather than to the material aid which he gave to me. This I can say in spite of having received from him the most generous sort of material help, such as the use of books from his library and the wealth of practical suggestions regarding my work which he contributed at all times.

"Although I had first met Mr. Law at a meeting of the Los Angeles Bird Banding Chapter of the Cooper Ornithological Club in 1924, it was not until the period from 1927 to 1929, while I was in attendance at Pomona College, Claremont, California, that I was privileged to visit him at his home in Altadena with any regularity. During these two years I began more and more to take advantage of his repeated invitations to come over whenever I could; and finally, thanks to the hearty welcome which he never failed to extend, I came to make the thirty mile trip between Claremont and Altadena nearly every week. Once, a fellow disciple, Joseph L. Cobb, and I journeyed out to Tucson, Arizona, in order to meet Mr. Law and his wife and stay for two days with them at one of their favorite camping spots in that interesting country. Once, too, I spent an entire week with the Laws at their Altadena home. Wherever and whenever I saw them they were always the same—generous alike with hospitality and with ideas which opened up new horizons to me.

"In looking back upon those times two characteristics of Mr. Law stand out with especial prominence and explain, in part, the stimulating effect which he had upon those who knew him. One of these was his faculty of seizing upon any incident, no matter how common, which he had chanced to observe in the life of a bird, and investing it with all the mystery and importance which rightfully belonged to it but which from the very familiarity of the incident had been overlooked by others. I

recall his telling me one morning of a Spotted Towhee which he had just been watching as it gathered materials for its nest. How far from the nest site would it go for the materials? Would it travel a long distance in search of certain desired constituents or would it simply take what was nearest and most available? These and a dozen other questions concerning the nest building habits of towhees had occurred to him during the few minutes that he had been watching them; and, as always, his eagerness to find the answers was highly contagious. The vigorous originality of his thought and the emphasis with which he would declare that many of the most fascinating problems of ornithology had not as yet been touched always made me want to start upon three or four of them that very day. 'The field is wide open to you youngsters who are just starting,' he used to say again and again; and then he would proceed to tell of some of the many questions in this wide open field which he himself wanted to investigate but which, he realized already, he would have to leave to those who would come after him.

"The other characteristic to which I refer was his warm personal interest in the problems and aspirations of those who were only beginners in the field of ornithology. He was never so engrossed in his own work that he was not ready at any time to answer their questions or to talk over their plans. Above all, it was, as I have already said, his general attitude which served as a powerful incentive to those who came in contact with him. In my own case, by constantly indicating that he expected important things of me, he made it impossible for me not to do my very best for fear of disappointing him."

Mr. Wright M. Pierce, of Claremont, California, a Governor of the Cooper Ornithological Club, contributes from his recollections the following statements which serve further to illuminate the extent to which Law exerted influence. Under date of February 17, 1932, Mr. Pierce writes me in substance as follows:

"I knew Gene first when he was at Pomona, often going to his home there to see his collections and to make trades. Also I made several short field trips with him. During the time he lived in Altadena I often visited him; it was he who started me in ornithology after I moved to Claremont. . . . He also started my interest in bird banding. . . .

"I made a trip into Lower California with Gene, early in 1926, I believe. While he was far from a well man then, he held up wonderfully and his mind was as keen as ever even though his body would not let him do all he wished. It was there that we met J. Stuart Rowley, whom we both knew, and his companion, a Mr. Simpson who was with Stewart Edward White in Africa."

Remembering that Law had spoken most warmly of a friendship of his with Dr. Josselyn Van Tyne, of the Museum of Zoology, University of Michigan, I asked the latter for some reminiscences such as might bear upon the subject of my proposed biography. Dr. Van Tyne promptly furnished the following statements, which again serve admirably to show how effectively Law was able, though doubtless unconsciously, to stimulate and guide the interest of others in the general field of ornithology.

"I first met Eugene Law when I was in California in 1924. There and then began one of the most valued friendships of my life. His was one of the finest minds and most attractive personalities I have ever known. And his friendly counsel and contagious enthusiasm inspired me as no other zoologist has ever done. I shall always be deeply grateful to him for his friendly but nevertheless keen criticism. Nothing was too much trouble for him. His replies to my youthful letters were always written as fully and carefully as though for publication. When I look over the volume of letters he wrote me I feel rather guilty that I should have taken so much of his time

and energy. But I treasure those letters now as my best text of ornithology. Although he was, I suppose, to be rated an amateur in training and position, yet his attitude of mind was truly scientific in rare degree. And particularly I admired that brilliant imagination controlled by sound common sense and scientific caution."

The important ways in which Law contributed to the development of both the technique and the philosophy of bird-banding are fully described by Mr. Harold Michener in a recent article in "News from the Bird-banders" (VII, January, 1932, pp. 1-2 [mimeographed]). I excerpt the paragraphs which seem most pertinent to the present biography from Mr. Michener's account, as follows:

"Soon after Mr. S. Prentiss Baldwin had published some of his results from trapping and banding birds, and the United States Bureau of Biological Survey had undertaken to promote and supervise bird banding throughout the United States, Mr. Law, recognizing the value of that method of studying birds, started it himself and began interesting others in it. By the fall of 1921 he had developed new and improved traps for catching the birds, was displaying them to members of the Southern Division of the Cooper Club, and telling of the interesting results he was getting. At this time he arranged to have space in *The Condor* for the publication of records of birds banded in the west. He collected and edited the material that appeared in this space. Later, beginning with the July, 1923, number of *The Condor*, this section appeared under the designation 'With the Bird Banders' and in it were published not only the reports of birds banded but many notes and articles about bird banding, a review of which brings a realization of the great amount of time and energy Mr. Law put into the promotion of this work.

"In June, 1922, the Southern Division of the Cooper Club, acting upon Mr. Law's recommendation, organized a committee known as the Bird-banding Chapter of the Southern Division of the Cooper Ornithological Club, for the purpose of stimulating interest in the study of birds by the banding method. Mr. Law was appointed chairman of this committee. In this position his influence was always toward the use of banding as a means of serious study of living birds by those qualified to make such studies. He drew about him a considerable group of earnest workers many of whom had not been members of the Cooper Club until he interested them in bird banding. Then in the latter part of 1924 he saw the need of an organization of the bird banders on the western part of the continent similar to the three bird-banding associations that united the banding activities in the eastern and central parts. He provided the motive spirit and did most of the work of preparing for such an association. The Bird-banding Chapter called a meeting on January 11, 1925, for the purpose of organizing the Western Bird-banding Association and Mr. Law was unanimously elected its president, which office he held until the spring of 1926 when in his great desire to devote all his too inadequate strength to his research work he prevailed upon his associates to relieve him of the duties of the presidency. However, the members of the Los Angeles Bird-banding Chapter insisted upon his remaining their president, which office he held until his death.

"It was as president of the Los Angeles Chapter that Mr. Law endeared himself most strongly to the hearts of the banders of that organization and cemented friendships among them which otherwise probably would never have been made. His extensive collection of bird skins, his ornithological library and his knowledge of birds were always freely available to help the banders in their problems. At the monthly meetings he always had something of interest for discussion, often reporting upon some of his own research work.

"Thus it was that from the very first he came to be the guiding spirit, the inspiration, to a degree that can scarcely be exaggerated; and for that group the memory of his generous kindliness and his teachings will live on with undiminished strength."

I wish to emphasize a point or two mentioned in Mr. Michener's contribution. Gene Law was a keen critic. He quickly saw the weak places in an article or in a program of activities, such as those that developed in the bird-banding field. And he did not refrain from expressing his views vigorously and to the point. Sometimes these expressions were contrary to dominant current opinion or practice. These qualities are manifest throughout the series of published articles in the *Condor* under the running title "With the Bird Banders." As a result, there is no doubt at all in my mind that very much of Law's own, then new, ideas concerning method and interpretation in this field served quickly to advance the science. Although not acknowledged at the time, because, perhaps, of certain personal reactions, those ideas were, nevertheless, absorbed into the general knowledge of the subject.

A man in the scientific world can leave no more lasting record of his life's activities than in the form of published contributions to his special field of knowledge. The gauge of his accomplishments will not, however, be applied on the basis of total quantity, or of length of the individual articles, but on the basis of soundness of fact and interpretation. In the case of Gene Law, a lasting record of exactly this nature is comprised in the series of articles on published record—all of them, it is interesting to note, in our magazine, the *Condor*—a medium of just such permanent record. For eminent, intrinsic value I will cite certain ones among Gene Law's total of 39 titles as listed in the appended bibliography.

Admirable examples of observational research are recorded in "A feeding habit of the Varied Thrush" (1921a), in "Down-tree progress of *Sitta pygmaea*" (1929a), and in "Another Lewis Woodpecker stores acorns" (1929f). Here we have conscientious, first-hand record of bird behavior, with interpretive analysis brought in, in cautious measure. Pterylosis and the subject of molt are dealt with importantly in articles included in the department "With the bird banders" (1925, pp. 121-123) and under the title "The spring molt in Zonotrichia" (1929d). Philosophic discussion, based upon accumulated data and following exhaustive study of the literature, dealt with "The function of the oil-gland" (1929b), "The rôle of the runt: a taxonomic problem" (1929c), and "An orangeless mutant of the Varied Thrush and its bearing on sex color-differences" (1931). This last published article of Gene Law's illustrates in particular a notable characteristic of his, namely, an impelling appetite to run down all possible bearings of the observed facts, not to be satisfied with a partial or hasty explanation. Very many of us workers in the ornithological field would do better than we have in the past, if we would cultivate this same characteristic.

I have personal knowledge that Gene Law left a number of articles altogether unpublished, on his "docket" already for years, simply because he did not consider them yet to come up to his ideals. He would pass an article to print only when he could feel satisfied that he had given its subject matter adequate thought. What an example for any true scientist to emulate in this age of breathless rush to "produce"—to accumulate a "personal bibliography"!

Years ago Gene Law set for himself as a major problem, for both field and study, the working up of the vertebrate fauna of the Chiricahua Mountains, Arizona. To this end he made several trips to those mountains, for which he came to have the fondest regard; collections of birds, mammals, reptiles and amphibians were gathered, extensive observations recorded upon a definite plan of faunal analysis, and critical

studies of the appertaining literature made. This wealth of accumulated materials will, it is now hoped, be worked up by someone well qualified to do it justice, the resulting published monograph to be dedicated to the memory of J. Eugene Law.

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1906. [Secretary's report, Southern Division C. O. C.] < Condor, VIII, November, p. 157.

1907. The English Sparrow in Los Angeles County. < Condor, IX, January, p. 28.

1910. Cowbird again Noted in Los Angeles County. < Condor, XII, September, p. 174.

1911. A Stray White Pelican. < Condor, XIII, January, p. 35.

1912a. Wood Ibis near Long Beach. < Condor, XIV, January, p. 41.

1912b. The American Merganser at Lake Tahoe. < Condor, XIV, January, pp. 41-42.

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1916b. Odd Performance of a Flicker with a Malformed Bill. < Condor, XVIII, March, p. 85.

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1919b. The Red-billed Tropic-bird in California. < Condor, XXI, March, p. 88.

1921a. A Feeding Habit of the Varied Thrush. < Condor XXIII, March, p. 66.

1921b. Bird Banding. < Condor, XXIII, November, pp. 196-197.

1923a. [Anonymous] Records of Birds Banded. < Condor, XXV, January, p. 33.

1923b. Banded Birds: a Graphic Form of Records for "Repeats". < Condor, XXV, July, pp. 119-120, figs. 39-40.

1923c. A Guilty Road-runner: Circumstantial Evidence. < Condor, XXV, July, pp. 133-134.

1923d. With the Bird Banders. < Condor, XXV, July, pp. 140-142; September, pp. 177-179.

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1926b. Injured Juncos Quickly Recover. < Condor, XXVIII, May, pp. 129-130.

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1929c. The Role of the Runt: a Taxonomic Problem. < Condor, XXXI, September, pp. 189-191.

1929d. The Spring Molt in Zonotrichia. < Condor, XXXI, September, pp. 208-212.

1929e. A Discussion of Faunal Influences in Southern Arizona. < Condor, XXXI, September, pp. 216-220.

1929f. Another Lewis Woodpecker Stores Acorns. < Condor, XXXI, November, pp. 233-238, figs. 67-69.

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Museum of Vertebrate Zoology, University of California, Berkeley, April 10, 1932.

A NEW RACE OF BOB-WHITE FROM COSTA RICA

By H. B. CONOVER

For many years the bob-white of Costa Rica has been called *Colinus leylandi* (Moore). Recently (Condor, XXXII, 1930, p. 72) Dickey and van Rossem have shown that *Ortyx leucopogon* of Lesson came from Salvador and not Western Panama, as had previously been supposed, and they have reduced *leylandi* to a race of *leucopogon* which is undoubtedly correct.

Ortyx leylandi (Moore) was described (Proc. Zool. Soc. London for 1859, pp. 62-63) from one specimen shot "at Flores on the road from Omoa to Comayagua," Honduras. The only Flores I have been able to find is a small town just south of San Antonio and about twelve miles south of Comayagua. While this place is not on the direct road from Omoa to Comayagua, the probabilities are that this is the locality mentioned by Moore. At any rate, since no bob-white seems ever to have been found on the Atlantic coast of Honduras, specimens from the region of Comayagua undoubtedly are typical.

In the past few months I have received some specimens from Monte Redondo, near Archaga, about halfway between Tegucigalpa and Comayagua, and from Comayaguela, just south of Tegucigalpa. On comparing these with birds from Costa Rica, I find that the males from the latter locality are quite different.

The Costa Rican race, therefore, may be known as

Colinus leucopogon dickeyi, new subspecies

Type.—From Las Cañas, Guanacaste, western Costa Rica; no. 1546, adult male in the Conover Collection, Field Museum of Natural History; collected May 3, 1923, by Austin P. Smith.

Characters.—Differs from *Colinus leucopogon leucopogon* and *Colinus leucopogon hypoleucus* by lacking the white on the forehead and by having the white feathers of the throat edged with black instead of pure white. Differs from *Colinus leucopogon leylandi* by having the feathers of the throat white with black edges instead of pure black. The ground color of the chest is more reddish (less grayish) and the unspotted area of the chest is much wider, extending on to the upper breast. The superciliary stripe and the white stripe running under the eye and ear coverts are more buffy. The upper parts are darker, the mantle being more heavily vermiculated with black. The outer webs of the inner secondaries and tertiaries are also more heavily barred with white. This barring is often practically lacking in *Colinus leucopogon leylandi.*

Description of type.—Top of the head brown, changing to light chestnut on the back of the head and nape. Lores and ear coverts brown. Stripes above and below the eye buffy white. Throat white, each feather bordered with black, giving a speckled appearance. Back and sides of the neck light chestnut, irregularly spotted with black and white. Lower neck, chest and upper breast gray washed with army brown, and finely vermiculated with brown. Flanks, breast and abdomen gray washed with army brown, and heavily marked with large, buffy, white spots, bordered with black. Under tail coverts black, heavily marked with large, buffy, white spots. Mantle gray, washed with army brown, and thickly vermiculated with brown. Upper back, scapulars and tertiaries like the mantle, but heavily blotched with black and marked with rufous. Inner webs of the tertiaries broadly edged with creamy white. Lower back and upper tail coverts gray mottled with black and wood brown, and narrowly banded with white. Tail brownish gray narrowly banded with white. Primaries and secondaries brown, the outer webs of the latter freckled with dirty white. Wing (flat) 106 mm.; tail 62 mm.; culmen (exposed) 9 mm.; tarsus 30 mm.; middle toe (with claw) 33 mm.

Range.—Plateau region and western slope of Costa Rica and probably similar country in southwestern Nicaragua.

Remarks.—There is great variation among these quail, and the subspecific characters are not invariably constant. However, a series of males from Costa Rica differs

greatly in appearance from a series of males from Honduras. The most important characters of the new race are the speckled throat and the more extensive unspotted area on the chest and upper breast. These characters hold for the majority of specimens.

Specimens from San Geronimo, Chinandega, northwestern Nicaragua, seem to be intermediate, having the black throats of *leylandi* but the more extensive unspotted area on the chest and breast of *dickeyi*.

The females of the several races of *Colinus leucopogon* do not differ greatly. In the series before me the specimens of *leylandi* from Honduras seem to be somewhat less heavily vermiculated on the mantle and to have less conspicuous narrow white bars on the tail than females of the other races.

I have named this race after the late Donald R. Dickey, whose interest in Central American birds is well known.

SPECIMENS EXAMINED

Colinus leucopogon leucopogon.—Salvador, Department Morazan, Divisadero, 5 ♂, 1 ♀;[5] Department La Union, Olomega 1 ♂;[6] Rio Goascoran 2 ♀.[5]

Colinus leucopogon leucopogon—C. l. hypoleucus intergrade.—Salvador: Department Cuscatlan, Colima, 6 ♂.[5]

Colinus leucopogon hypoleucus.—Salvador: Department La Paz, Hacienda Miraflores, 1 ♂;[6] Department Sonsonate, Volcan Santa Ana, 1 ♀;[6] Department La Libertad, Hacienda Zapotitan, 1 ♀,[5] Setro del Niño, 1 ♀;[5] Department Santa Ana, El Tablon, 5 ♂.[6]

Colinus leucopogon leylandi.—Honduras: Department Tegucigalpa, Monte Redondo, 7 ♂, 11 ♀,[1] Comayaguela, 3 ♂, 4 ♀.[1]

Colinus leucopogon leylandi—C. l. dickeyi intergrade.—Nicaragua: Department Chinandega, San Geronimo, 9 ♂, 5 ♀.[2]

Colinus leucopogon dickeyi.—Costa Rica: Guanacaste, Las Cañas, 10 ♂, 6 ♀,[6] Miravalles, 1 ♂, 1 ♀;[1] Cartago, Vol. Irazu, 3 ♂, 2 ♀;[1] Turrucares 1 ♂;[1] Alajuela, 1 ♂;[3] San Jose, 1 ♂, 2 ♀;[7] Santo Domingo de San Mateo, 1 ♂;[3] Orosi, 3 ♂, 1 ♀;[7] Agua Caliente, 1 ♂;[4] Costa Rica, 1 ♂, 1 ♀.[3]

[1] Specimens in Conover Collection.
[2] Specimens in Field Museum, Chicago.
[3] Specimens in U. S. National Museum, Washington.
[4] Specimens in American Museum of Natural History, New York.
[5] Specimens in Collection of Donald R. Dickey.
[6] Specimens in Conover, Field Museum, and American Museum Collections.
[7] Specimens in Field Museum and National Museum Collections.

I am indebted to the late Donald R. Dickey and to the officials of the following institutions for the loan of specimens necessary for this investigation: Field Museum of Natural History, Chicago; U. S. National Museum, Washington; American Museum of Natural History, New York.

Chicago, Illinois, April 23, 1932.

FOOD HABITS OF SOUTHERN WISCONSIN RAPTORS

PART I. OWLS

By PAUL L. ERRINGTON

The primary object of the studies by which the following data on owls were gathered was to determine the relation of birds of prey to the Eastern Bob-white (*Colinus virginianus virginianus*). In addition to studies of quail and raptor by intensive field observations to ascertain exact or nearly exact covey losses, special effort was made to obtain the quantitative data so necessary for an ecological approach to the problem. Thus the material collectively has broader application than to a single game species. The major part of the research was carried on in Dane, Sauk, and Columbia counties by the Wisconsin Quail Investigation (Sporting Arms and Ammunition Manufacturers' Institute, U. S. Biological Survey, and University of Wisconsin).

A technique (see Errington, 1932) of visiting the favorite winter and spring roost trees of individual owls and of tethering out grown juveniles (to be fed late into the summer by adult birds) made possible the acquisition of some thousands of more or less accurately dated pellets from seven owl species. In some instances, nearly complete diets of certain owls over periods of months were recorded. Previous papers (Errington, 1930a, 1932) have dealt with the experimental checking by which it was demonstrated that even animal matter as delicate as 13 gram (10 day old) quail chicks withstood Horned Owl digestion sufficiently well to be recognizable in pellets, and that, in short, pellets reflected quite satisfactorily ordinary strigine food habits.

The specific origin of the various pellet lots, unless otherwise stated, is considered reasonably correct, for most of the doubtful pellets have been discarded. Least satisfactory are those of fall deposition (judged by contained juvenile prey, etc.), but found in late winter and really too valuable in filling in important seasonal gaps to throw away—least satisfactory not so much because of doubtful origin but because of the difficulty with which old pellets are dated. In general, there can be little doubt as to the source of fresh pellets picked up under known favorite owl roosts, from or under occupied nests, or from beside tethered juveniles. Then, too, I have taken pains to familiarize myself with the habits and idiosyncrasies of a number of individual owls contemporaneous with the collection of their pellets.

It may be said, preliminarily to the presentation of data according to species, that the bulk of the pellet analyses were conducted by myself at Madison, hurriedly, and with the aid of an improvised and none too adequate osteological reference collection. I have Biological Survey analyses on my most troublesome 1930 specimens, namely, 25 Barred Owl pellets, 69 of Horned Owl, and odd pellets and stomachs, but these comprise a small proportion of my total volume of material. A final check-over of the balance will unquestionably reveal vertebrate items missed, items duplicated, and, not inconceivably, some items misidentified, particularly as concerns the smaller mice.

Supplementary to the pellet analyses, data were obtained during the seasons of 1930 and 1931 on 21 nests of Horned Owl, 9 of Barred Owl, 4 of Long-eared Owl, and 2 of Screech Owl. Observational data procured were mainly incidental to the winter quail mortality studies. Since pellet data and those derived from nest visits and "sign reading" to a conspicuous extent overlapped, data from the latter two sources will not be listed in their entirety.

SAW-WHET OWL Cryptoglaux acadica

Evaluation of data.—Fair but scanty. There is chance of a slight contamination of Screech Owl pellets in the Pine Bluff lot.

No. 1. *West of Pine Bluff.*—January (?) to March, 1930, 70 pellets plus fragments of about 15 more, presumably the winter's accumulation of a single owl seen but once in the juniper thicket which served as headquarters. Contents, on basis of skulls alone: meadow mouse (*Microtus*), 13; deer mouse (*Peromyscus*), 51; junco, 1. Exclusive of the preceding were 23 pellets of skull-less mouse remains, mostly *Peromyscus*.

Wild life species of sizes perhaps suitable for prey present within one-quarter mile of the junipers: meadow mice (extremely abundant but well protected by snow), deer mice (abundant), bluejays, hairy and downy woodpeckers, nuthatches, chickadees, etc. (common).

East of Prairie du Sac.—March 16, 1930, 2 pellets from a migrant, both of which seemed to be made up of the same deer mouse.

Summary of Saw-whet Owl Food Habits.—The diet of this little owl apparently is strictly limited by the size, abundance and availability of prey. It is probable that one fair-sized mouse lasts two meals.

Adverse effect upon quail: none. A covey (7 to 23) was within the cruising radius of the Pine Bluff saw-whet.

SCREECH OWL Otus asio

Evaluation of data.—Poor. Data are few, scattered and much restricted to winter and spring months. The Denzer lot (no. 3) may have some contamination of saw-whet pellets.

No. 2. *Madison.*—November, 1929, to May, 1931, contents of 72 pellets, principally from the University campus, roughly divided up as to seasons:

Fall, 1929: meadow mouse, 12; shrew (*Blarina*), 1.

Winter, 1929-30: meadow mouse, 15; deer mouse, 1; small bird, 4.

Fall, 1930: deer mouse, 1; small bird, 4; fish, 1.

Winter, 1930-31: meadow mouse, 2; deer mouse, 1; shrew, 2; small bird, 14.

Spring, 1931: meadow mouse, 1; shrew (*Blarina* and *Sorex*), 2; small bird, 12; pellets containing fish, 3; pellets high in insects, 5; pellets containing crayfish (*Cambarus*), 2.

Of basic significance might be considered the effect on the Screech Owl's diet of the 1930 die-off of the meadow mice which in 1929 had attained a pronounced abundance peak. Meadow mice virtually gone, the owls took to other prey, mostly English Sparrows, though native warblers and finches did not escape without some loss.

No. 3. *Denzer.*—December, 1929, 17 probable Screech Owl pellets from wooded hilly country. Contents on basis of skulls: meadow mouse, 4; deer mouse, 8.

No. 4. *North of Prairie du Sac.*—January (?) to March, 1930, about 18 Screech Owl pellets from woods along Wisconsin River. Contents on basis of skulls: Norway rat, 1; meadow mouse, 5; deer mouse, 8.

No. 5. *West of Pine Bluff.*—February (?) to March 15, 1930, about 12 probable Screech Owl pellets from a wild, dense woodlot. Contents on basis of skulls: meadow mouse, 4; deer mouse, 4.

The owls of nos. 3, 4, and 5 had access to approximately the same winter bird life mentioned under no. 1.

No. 6. *Daleyville.*—March to mid-April, 1931, 10 pellets from a wooded "island" in a farming community: meadow mouse, 4; deer mouse, 9; small bird, 1; crayfish, 1.

Miscellaneous Screech Owl pellets and stomachs, mainly from spring, 1931: meadow mouse, 2; deer mouse, 5; shrew (*Blarina*), 2; small bird, 1; stomach full of crickets, 1; pellets high in insects, 4.

Summary of Screech Owl Food Habits.—My Wisconsin record for Screech Owl vertebrate and large invertebrate prey totals up to 137 individuals, in the following proportions: Norway rat, 1; meadow mouse, 49; deer mouse, 37; shrew (*Blarina*, 6;

Sorex, 1), 7; small bird (predominantly English Sparrow according to feather evidence of kills), 36; fish, 4; crayfish, 3.

As a rule Screech Owls ate about what was most convenient to catch and of a size easy to handle. Their preferred prey seemed to be mice if such were available; in the event of mouse shortage they turned readily to small birds. During the warmer months large invertebrates (crayfish, June beetles, crickets) made up a considerable portion of their food. No evidences were found of Screech Owls taking birds larger than finches, though the owls of no. 2 had unlimited opportunities to do so.

Adverse effect upon quail: likely none under ordinary circumstances. Quail coveys in observational areas were not known to be molested in any way by Screech Owls.

SHORT-EARED OWL Asio flammeus

Evaluation of data.—Good, for winter. The data, while not as numerous as might be wished, are so uniform that they may be looked upon as rather typical for the months that Short-eared Owls are seen in southern Wisconsin.

No. 7. *East of Pine Bluff.*—December, 1929, and January, 1930, 55 pellets from an owl that habitually perched on the tops of a few corn shocks left in a field over winter: meadow mouse, 34; deer mouse (a field form, probably *Peromyscus maniculatus bairdi*), 103; snow bunting, 1.

In the above small field (a quail observational area) the most ideal game-rodent-predator balance prevailed that I have ever noted. A fine covey of around 20 quail relied for food and cover upon the very corn shocks used by the Short-eared Owl, yet were untroubled by the latter. The owl picked up the mice that ran from shock to shock, keeping them down well enough to reduce the damage by about two-thirds—this in a winter of terrific rodent-bird food competition and when the interiors of almost all shocks examined elsewhere were heaped with mouse débris.

A heavy population of snow buntings, goldfinches, redpolls, tree sparrows, etc., in stubble fields nearby, to appearances drew but scant attention from the owl.

No. 8. *Southeast of Madison.*—February, 1930, 10 pellets from roosts on haystacks: meadow mouse, 10; deer mouse, 2.

No. 9. *West of Pine Bluff.*—February and March, 1930, 11 pellets from roosts in a sweet clover patch: meadow mouse, 5; deer mouse, 8.

This owl had access to the same bird life as the one of no. 7. A covey of 18 quail wintered in the short-ear's exact territory, with no loss during two months of censusing.

Miscellaneous.—Short-eared Owl kills and pellet contents, mostly from the vicinity of Madison, and for January, 1931: meadow mouse, 19; deer mouse, 2. The only non-winter datum I have is from a stomach sent in September 27, 1930, from the center of the state (Babcock). Contents: meadowlark.

Summary of Short-eared Owl Food Habits.—Total vertebrate kills on file: meadow mouse, 68; deer mouse, 115; snow bunting, 1; meadowlark, 1.

The Short-eared Owls seemed to show a distinct preference for small mammalian over small avian prey, even at times when small birds may have actually far outnumbered the rodents which were depended upon for food. The seeming preference for mammals might be explained by the short-ear's penchant for diurnal hunting; small birds, though in tremendous flocks, doubtless are too elusive in daylight for such a slow predator, hence the latter relies upon mice which it can catch. Again, it is probable that the species settles itself into a hunting routine to which it clings indefinitely unless forced by environmental changes to alter its habits.

Adverse effect upon quail: none in the light of evidence at hand, at any rate none for the winter months.

LONG-EARED OWL Asio wilsonianus

Evaluation of data.—Excellent from October to March, fair for April, May, June and September, very weak for July and August. Although the most intensive studies

dealt with the winter of 1929-30, the species was watched closely enough in 1930-31 to obviate any likelihood of important departures from known food habits passing unnoticed.

No. 10. *McFarland.*—September, 1929, to February, 1930, 177 pellets from two Long-eared Owls in a one-acre tamarack swamp, from fall until the time that the owls were evidently shot toward the end of the winter. Pellet contents: meadow mouse, 252; deer mouse, 4; shrew (*Blarina*), 2.

Small birds most abundant were tree sparrows and the usual winter species partial to tamaracks. A covey of quail used the swamp as cover until starvation compelled them to move, about January 1, 1930.

No. 11. *Madison* (Eagle Heights).—November, 1929, to April, 1930, 35 pellets from more than one owl, lumped to give a food habits composite for the area (a wild life refuge): meadow mouse, 43; deer mouse, 4; shrew (*Blarina*), 1.

Conspicuous bird life: quail (89 censused in March on about 500 acres), bluejays, cardinals, native and English sparrows, hairy and downy woodpeckers, nuthatches, creepers, chickadees.

No. 12. *Denzer.*—March 29, 1930, a report had come in concerning hunters who in December had found a concentration of Long-eared Owls in the dogwood and alder growths bordering a creek. One man had shot 17 in a day and said that about as many more got away. The owls had been shot, of course, because of "killing off the rabbits." I looked over the creek brush, found plenty of roosts, and remains of some of the dead owls. There were hundreds of pellets in sight at once from strategic places, thousands altogether.

Ninety-seven pellets picked up at random gave: meadow mouse, 128; deer mouse, 27; shrew (*Blarina*), 1. Approximately 300 pellets looked over hastily on the ground failed to yield anything but these three genera of mammals.

No. 13. *Southwest of Madison.*—May to middle of June, 1930, bulk of pellet material from beneath a late Long-eared Owl nest: meadow mouse, 32; deer mouse, 4; shrew (*Blarina*), 5.

Alternate prey available: an abundance of the summer bird life usually found in southern Wisconsin woodlots, that is, flickers, catbirds, thrashers, flycatchers, etc.

No. 14. *West of Prairie du Sac.*—October, 1929, to May, 1930, winter accumulation of Long-eared Owl pellets from two tracts (about 1 and 3 acres) of conifers planted in a sand prairie. Pellets examined in bulk: Norway rat, 2; meadow mouse, 2,108; deer mouse, 373; shrew (*Blarina*), 1; small bird, 10.

These conifers are a favorite winter rendezvous for many birds, including jays, goldfinches, waxwings, and crossbills. The surrounding prairies, too, are often rich in boreal species.

A program of long-ear nest studies came to an abrupt end by virtue of an annual human "sporting" custom of "cleaning out the owls" on Sunday afternoons.

No. 15. *West of Prairie du Sac.*—September to November, 1930, bulk pellet material from same area as no. 14: cottontail (juvenile), 1; meadow mouse, 101; deer mouse, 50; shrew (2 each of *Blarina* and *Sorex*), 4; small bird, 3.

No. 16. *West of Prairie du Sac.*—Middle of April to middle of May, 1930, pellets from nesting Long-eared Owls in juniper-grown hills a couple miles northeast of no. 14: meadow mouse, 41; deer mouse, 8; shrew (one each of *Blarina* and *Sorex*), 2; small bird, 13. The following small birds were identified from pellets and nests: brown thrasher, horned lark, Savannah sparrow, white-throated sparrow, junco, towhee, scarlet tanager.

Miscellaneous.—Long-eared Owl pellets and stomach contents, mostly from February and March, 1931: Norway rat, 1; meadow mouse, 27; deer mouse, 27; shrew (*Blarina*), 1.

Summary of Long-eared Owl Food Habits.—Total vertebrate kills from pellets and stomachs (quantitative data) amount to 3273: juvenile cottontail, 1; Norway rat, 3; meadow mouse, 2732; deer mouse, 497; shrew, 14; small bird (mostly finches), 26.

The mammal-bird ratio, manifestly too top-heavy with winter data to be representative of year-round food habits, may be apportioned between the seasons:

Fall, winter, early spring, 1929-30, 2946 mammals (99.66%): 10 birds (.34%).
Late spring, early summer, 1930, 92 mammals (87.62%): 13 birds (12.38%).
Late summer, 1930, 25 mammals (92.6%): 2 birds (7.4%).
Fall and early winter, 1930, 131 mammals (99.24%): 1 bird (.76%).
Late winter and early spring, 1931, 56 mammals (100%).

Attention might be drawn to the surprising similarity of food habits for the winters of 1929-30 and 1930-31, despite the drastic reduction of meadow mice early in 1930. Although the deer mice supplanted in part the meadow mice, the steady occurrence of the latter in the Long-ear's diet leads one to suspect that the food habits of this owl are inexplicable in simple terms of availability of prey. Why did not the Long-ear prove itself the opportunist that the Screech Owl did (see no. 2), when the meadow mice dropped off? Was it inflexibility of instincts? Or were the meadow mice remnants still the most available prey, though not the most abundant?

Adverse effect upon quail: negligible. I have a solitary record of a quail kill—a weathered sternum in a Long-ear nest. Long-eared Owls were common in some of my best quail observational areas (see Errington, 1930b, 1931b) and caused no discernible trouble.

BARN OWL Tyto alba pratincola

Evaluation of data.—Excellent except for the restricted locality and except that the pellets were not kept separate in the strictest sequence of ages.

No. 17. *Madison (Shorewood and Eagle Height areas).*—June (?), 1929, to February, 1930, 319 pellets from 4 Barn Owls which to the best of my knowledge frequented mainly an old rock quarry and also certain planted evergreen thickets. There had apparently been a successful nesting in the quarry in the season of 1929.

Pellet contents totaled 893 kills: Norway rat, 8; meadow mouse, 742; deer mouse, 24; shrew (110 of *Blarina* and 5 of *Sorex*), 115; bluejay, 1; small bird, 3.

Alternate prey available: the variety of bird life given under no. 11.

Summary of Barn Owl Food Habits.—The natural question of what effect the subsequent meadow mouse failure had on the diet of these owls can be partially answered. Of the four (?) Barn Owls studied, one was collected by an ornithologist in November, two were found dead from hunger and cold in early February (see Errington, 1931a), and no sure trace was seen of the fourth after the last of the month. The continued adherence to the mammalian diet, even under stress of want, and amid an abundance of winter birds, may point to an inadaptability possibly delimiting the northern range of the species.

Adverse effect upon quail: negligible, if any. A fragmentary, shapeless, weathered, and moss-grown pellet of some kind beneath one of the roost crevices in the quarry disclosed quail remains, but the pellet was much older than any of the bona fide barn owl pellets. Indeed, on the basis of the quail's gizzard contents of black locust and sweet clover seed (a common food combination of desperate, starving bobwhites), the pellet can be dated back to the severe winter of 1928-29, when it is not known that Barn Owls were in the quarry at all.

BARRED OWL Strix varia

Evaluation of data.—Excellent for spring and summer of 1931, except for the fewness of birds studied; otherwise too fragmentary.

No. 18. *Dane, Sauk, and Columbia counties.*—March to middle of May, 1930, pellets from 6 nests: cottontail (juvenile), 1; flying squirrel, 2; fox squirrel (juvenile), 1; meadow mouse, 10; deer mouse, 8; house mouse (*Mus*), 2; unidentified mouse, 4; robin, 1; bluejay, 1; flicker, 3; small bird, 19; frog, 4; salamander, 2; crayfish, 1. Total vertebrate and large invertebrate kills: 59 in proportions of 28 mammals (47.46%), 24 birds (40.68%), misc., 7 (11.86%).

In addition to the pellet material evidences of the following species were found about the nests: mole (*Scalopus*), Barn Swallow, Tree Swallow, Bank Swallow, Cardinal, White-throated Sparrow, junco, towhee, Yellow-headed Blackbird, Brown Thrasher, Yellow-bellied Sapsucker, Hairy Woodpecker, kingfisher, and Screech Owl. Flicker and bluejay feathers were most often to be noted.

No. 19. *Southwest of Lodi.*—May 24 to August 8, 1931, pellets from a tethered juvenile (attended and fed by adult owls): cottontail (juvenile), 9; flying squirrel, 4; grey (?) squirrel (juvenile), 1; chipmunk (*Tamias*), 3; meadow mouse, 10; deer mouse, 77; mole, 2; shrew (19 *Blarina* and 2 *Sorex*), 21; Ruffed Grouse (?) chick, 1; small bird, 11; snake, 6; frog, 5; pellets high in insects, 15; crayfish, 2. Total: 167, in proportions of 127 mammals (76.05%), 12 birds (7.18%), misc., 28 (16.77%).

No. 20. *North of Prairie du Sac.*—May 24 to July 12, 1931, pellets from a juvenile tethered along the Wisconsin River: cottontail (juvenile), 2; flying squirrel, 1; meadow mouse, 2; deer mouse, 27; small mink, 1; bat (*Myotis*), 1; mole, 6; shrew (*Blarina*), 5; flicker, 2; Screech Owl, 1; small bird, 11; snake, 1; frog, 1; fish, 3; pellets high in insects, 1; pellets high in crayfish, 30. Total: 95, in proportions of 45 mammals (47.37%), 14 birds (14.73%), misc., 36 (37.9%).

Miscellaneous pellets, stomachs, etc., give: cottontail (juvenile), 2; ground squirrel (*Citellus*), 1; suckling grey (?) squirrel, 1; deer mouse, 6; frog, 1; snake, 1; fish, 1; crayfish, 2.

Summary of Barred Owl Food Habits.—It can perhaps be surmised from the data, without discussion, that the food of the Barred Owls was determined in the main by what was available to them. Their food was further determined by what was within the power of their weak feet to kill. The ordinary size limit for avian prey was the flicker; for mammalian prey, moles and part-grown cottontails. The mink listed in no. 20 is the one glaring exception that I have encountered, though it is not to be said positively that the mink had not died from causes other than Barred Owl talons. Possibly it had attempted liberties with the tethered owlet. Altogether, the Barred Owl seems endowed with about as mild a personality as a raptor could have and yet maintain a predaceous existence, in some instances subsisting for considerable periods upon large invertebrates (insects and crayfish) or upon fish or amphibians.

Adverse effect upon quail: none discovered. While a Barred Owl doubtless has the strength to kill a quail that it gets firm hold of, the probabilities of its making a catch appear so slight as to be of trifling consequence. Quail, for one thing, have not been noted to care especially for the deep woods which constitute the Barred Owl's usual haunts. Again, bob-white coveys in the winter observational areas have habitually frequented the favorite hunting grounds of the much more formidable Horned Owls without undue casualties. .

GREAT HORNED OWL **Bubo virginianus**

Evaluation of data.—Generally excellent save for late summer and early fall. There is, however, a serious weakness in the pellet tabulations which have to do with large and medium-sized prey; single kills have been known to be represented in more than one pellet, which representations when listed as separate kills are certainly productive of quantitative error. Fore and hindquarters of individual quail, flying squirrels, and other distinctive prey are often found in different pellets; a cottontail or the like may serve for several meals. For lack of any better way of handling the matter, the mere occurrence in a pellet of a portion of an animal too big to be eaten at once is commonly put down in the following data as a kill, though not without appreciation of the short-comings of such procedure.

No. 21. *Verona.*—Fall (?), 1929, to August, 1931, 190 pellets from 2 Horned Owl territories:

Fall (?), 1929, to March, 1930, 40 pellets: cottontail, 11; Norway rat, 7; meadow mouse, 38; deer mouse, 100; house mouse, 1; shrew (*Blarina*), 3; small bird, 1.

April, 1930, 16 pellets: cottontail (incl. 1 juvenile), 6; Norway rat, 5; meadow mouse, 4; deer mouse, 16; unidentified mouse, 3; crow, 4; domestic pigeon, 1.

May, 1930, 21 pellets: cottontail, 11; meadow mouse, 2; deer mouse, 5; unidentified mammal (incl. 1 mouse), 3; crow, 1; bluejay, 1; domestic chicken, 1; King Rail, 1; unidentified bird, 5; snake, 1.

August, 1930, 2 pellets: cottontail, 1; shrew (*Blarina*), 1; insects.

Fall (?), 1930, to February, 1931, 34 pellets: cottontail, 23; Norway rat, 4; meadow mouse, 19; deer mouse, 42; shrew (*Blarina*), 2; domestic pigeon, 1.

March, 1931, 12 pellets: cottontail, 5; Norway rat, 1; meadow mouse, 4; deer mouse, 42; quail, 1; unidentified bird, 1.

April, 1931, 7 pellets: cottontail (incl. 3 juvenile) 9; deer mouse, 7.

May, 1931, 19 pellets: cottontail (incl. 6 juvenile), 20; Norway rat, 5; chipmunk, 1; meadow mouse, 3; deer mouse, 36; shrew (*Blarina*), 1; small bird, 2; pellets high in insects, 2.

June, 1931, 14 pellets from tethered owl: cottontail (incl. 4 juvenile), 7; Norway rat, 4; meadow mouse, 1; deer mouse, 3; domestic chicken, 4; snake, 1.

July, 1931, 21 pellets from tethered owl: cottontail (incl. 2 juvenile), 7; Norway rat, 2; meadow mouse, 1; deer mouse, 2; weasel, 1; domestic chicken (all sizes of young), 12; pellets high in insects, 1.

August, 1931, 4 pellets from tethered owl: domestic chicken, 4.

For the Verona area, the data are spread out sufficiently to give some idea of the year-long food habits of the Horned Owl. Disregarding what hiatuses remain and the question of how representative the nearly straight diet of domestic chicken toward the end of the observational period may be, the 1929-31 known vertebrate kills (subject in part to the criticism made in evaluation of data) sums up to 504.

Totals for each type are: cottontail (incl. 16 juvenile), 100; Norway rat, 28; chipmunk, 1; meadow mouse, 67; deer mouse, 253; weasel, 1; shrew (*Blarina*), 7; unidentified mammal, incl. mice, 7; crow, 5; bluejay, 1; domestic pigeon, 2; domestic chicken, 21; quail, 1; King Rail, 1; small and unidentified birds, 8; snake, 2.

Present in the area were a fair population of quail and a light population of Ruffed Grouse.

No. 22. *Pine Bluff.*—January (?) 1930, to August, 1931, 223 pellets from 5 Horned Owl territories:

January (?) to March, 1930, 28 pellets: cottontail, 12; muskrat, 1; Norway rat, 3; meadow mouse, 18; deer mouse, 43; house mouse, 1; shrew (*Blarina*), 4; Long-eared Owl, 1; small birds, 2.

Fall (?), 1930, to January, 1931, 16 pellets: cottontail, 10; flying squirrel, 1; meadow mouse, 2; deer mouse, 36; weasel, 1; shrew (*Blarina*), 1; Ruffed Grouse, 1; small bird, 1; pellet high in insects, 1.

February, 1931, 80 pellets: cottontail, 57; flying squirrel, 4; Norway rat, 2; meadow mouse, 41; deer mouse, 65; weasel, 1; Ruffed Grouse, 1; small bird, 1.

March, 1931, 18 pellets: cottontail, 13; meadow mouse, 5; deer mouse, 17; meadowlark, 1; domestic pigeon, 1; small bird, 2; snake, 2.

April, 1931, 18 pellets: cottontail (incl. 1 juvenile), 12; Norway rat, 2; meadow mouse, 4; deer mouse, 46; bluejay, 1; snake, 1.

May, 1931, 21 pellets, partly from tethered owl: cottontail (incl. 5 juvenile), 15; Norway rat, 5; meadow mouse, 1; deer mouse, 8; shrew (*Blarina*), 1; flicker, 1; Screech Owl, 1; domestic pigeon, 2; domestic chicken, 1; small bird, 5; pellets high in insects, 2.

June, 1931, 19 pellets from tethered owl: cottontail (incl. 2 juvenile), 13; Norway rat, 6; deer mouse, 1; skunk (adult?), 1; domestic chicken, 1.

July, 1931, 15 pellets from tethered owl: cottontail (incl. 1 juvenile), 1; Norway rat, 7; meadow mouse, 1; skunk (juvenile), 1; domestic chicken, 4.

August, 1931, 8 pellets from tethered owl: cottontail (incl. 1 juvenile), 2; chipmunk, 1; Norway rat, 6; meadow mouse, 1; pellets high in insects, 1.

Omitting the first isolated lot of 28 pellets, we might look upon the remainder of the above as furnishing a somewhat accurate cross-section of the Horned Owl's food habits in the Pine Bluff area for practically a full year, that is, fall (?) of 1930 to late summer, 1931, notwithstanding the preponderance of February material.

Totals from 195 pellets: cottontail (incl. 10 juvenile), 123; flying squirrel, 5; chipmunk, 1; Norway rat, 28; meadow mouse, 55; deer mouse, 173; weasel, 2; skunk,

2; shrew (*Blarina*), 2; meadowlark, 1; bluejay, 1; flicker, 1; Screech Owl, 1; domestic pigeon, 3; domestic chicken, 6; Ruffed Grouse, 2; small bird, 9; snake, 3.

The Horned Owl territories where the Pine Bluff material was collected were of a rugged, wooded, hilly type interspersed with cultivated fields. Quail and Ruffed Grouse were abundant within short cruising radii of most of the owls, but the Bob-whites suffered only trivial Horned Owl losses in the winter observational areas for weeks at a time (see Errington, 1930b, 1931b).

No. 23. *Madison* (*Pheasant Branch and Owen's Woods*).—Fall (?), 1929, to middle of April, 1930, contents of 64 pellets: cottontail, 8; flying squirrel, 3; Norway rat, 16; meadow mouse, 70; deer mouse, 129; unidentified mouse, 2; shrew (*Blarina*), 25; bluejay, 1; small bird, 4.

The bird life of this area was much the same as that given under no. 11. Cottontails had been greatly reduced by over-shooting.

No. 24. *Madison* (*Hammersley Slough, just southwest of town*).—Early fall, 1930, to July, 1931.

Early fall, 1930, to January, 1931, 48 pellets: cottontail, 31; flying squirrel, 1; Norway rat, 20; meadow mouse, 13; deer mouse, 38; shrew (*Blarina*), 1; quail, 6; unidentified bird, 1.

February, 1931, 11 pellets: cottontail, 11; deer mouse, 3; quail, 1; Mallard (probably the same bird), 2.

March, 1931, 10 pellets: cottontail, 7; Norway rat, 1; deer mouse, 1; robin, 1; coot (?), 2; Mallard, 3.

April, 1931, 17 pellets: cottontail, 15; Norway rat, 2; meadow mouse, 6; deer mouse, 8; shrew (*Blarina*), 1; coot (plus one foot in another pellet), 1; Mallard, 2.

May, 1931, 28 pellets from adults and tethered juvenile: cottontail (incl. 1 juvenile), 16; Norway rat, 3; meadow mouse, 5; deer mouse, 2; flicker, 1; Lesser Yellow-legs, 1; gallinule, 1; rail, 4; Mallard, 3; Pied-billed Grebe, 1; medium-sized unidentified bird, 3; small bird, 5; snake, 1; pellets high in insects, 2.

June, 1931, 10 pellets from tethered owl: cottontail (incl. 1 juvenile), 3; fox squirrel, 1; chipmunk (juvenile), 1; muskrat (juvenile), 3; Norway rat, 5; deer mouse, 1; gallinule, 1; medium-sized unidentified bird, 1; small bird, 1; snake, 1; pellets high in insects, 3.

July, 1931, 5 pellets from tethered owl: chipmunk (plus fur in another pellet), 1; Norway rat, 1; deer mouse, 2; quail, 1.

The Hammersley Slough area, occupied by a nesting pair of Horned Owls, was scarcely outside of the city limits of Madison and was made up of diverse environments—suburbs, truck gardens, golf courses, a marsh, pastured and unpastured woodlots. The wooded tract in which the nest was situated was over-pastured, hence, unproductive of game, so the owls had to do most of their hunting elsewhere.

That they were rather pressed for food at times is indicated by the diversity of forms taken, by the distance to some of their known sources of prey (¾ mile or more), and by the relatively frequent representation of quail and diurnal Sciuridae, which latter two ordinarily may be regarded as of accidental occurrence in Horned Owl diet. In fact, depredations were traced to only two quail coveys, these coveys having an original combined population of around 40 birds (minus 9 that I collected for specimens throughout fall and winter), far below populations in some other Horned Owl territories (see Errington, 1930b, 1931b) where the total Bob-white loss varied from nothing to a bird or two for the winter.

Ring-necked Pheasants were locally well established, but I never ran across any kills by Horned Owls.

Total vertebrate prey from 129 pellets, early fall 1930 to July, 1931, neglecting probable errors from duplication, 247, in proportions of: cottontail (incl. 2 juvenile), 83; flying squirrel, 1; fox squirrel, 1; chipmunk, 2; muskrat, 3; Norway rat, 32; meadow mouse, 24; deer mouse, 55; shrew (*Blarina*), 2; robin, 1; flicker, 1; quail, 8; Lesser Yellow-legs, 1; Coot (?), 3; gallinule, 2; rail, 4; Mallard, 10; Pied-billed Grebe, 1; medium-sized unidentified bird, 5; small bird, 6; snake, 2.

No. 25. *Madison* (*Lake Wingra Wild Life Refuge*).—Winter 1930-31, 35 pellets: cottontail, 29; flying squirrel (probably the same one), 2; Norway rat, 1; meadow mouse, 1; deer mouse, 14; weasel, 1; shrew (*Blarina*), 4; rusty (?) blackbird, 1.

The Wingra situation, contrasted with that of the Hammersley Slough area, illustrates the bearing of plentiful "buffer species" on the diet of a versatile predator.

Up to a hundred Mallard ducks frequented shore-line springs of the refuge all winter, and the lone owl's territory was cohabited by three large coveys of quail, yet he was known to get but two (and one of these kills was not unquestionable) quail (see Errington, 1931b) and no ducks during a four months' sojourn. Why? Because the refuge was over-run with rabbits, and *Bubo* had slight need of ranging very far in quest of something to eat. On the other hand, the owls of no. 24, finding comparatively "lean pickings" near home, had to take almost anything they could get.

No. 26.—*Southwest of Daleyville.*—Winter of 1930-31, 9 pellets: cottontail, 7; flying squirrel, 1; deer mouse, 18; shrew (*Blarina*), 1.

April, 1931, 4 pellets: cottontail, 4.

The Daleyville area was a vestigial block of rough, wooded land in an otherwise denuded dairy community. In the woods lived a number of Ruffed Grouse; adjacent, several coveys of quail.

No. 27. *McFarland (Lake Kegonsa).*—Fall, 1929, and winter, 1929-30, 21 pellets: cottontail, 5; Norway rat, 7; meadow mouse, 35; deer mouse, 21; shrew (*Blarina*), 1; Song Sparrow, 1; Red-winged Blackbird, 1; starling, 1; bluejay, 1.

Fall (?), 1930, 5 pellets: cottontail, 4; meadow mouse, 4; deer mouse, 3; shrew (*Blarina*), 1.

New Years (?) to March, 1931, 12 pellets: cottontail, 9; Norway rat, 1; meadow mouse, 4; deer mouse, 6; shrew (*Blarina*), 1; Screech Owl, 2; small bird, 1.

April, 1931, 8 pellets: cottontail, 5; meadow mouse, 7; deer mouse, 1; weasel, 1; shrew (*Sorex*), 2; robin, 1; gallinule, 1; duck (*Marila*), 1; small bird, 1; crayfish, 1.

The McFarland area, regrettably, had to be dropped from observation about the time that waterfowl began to be brought to a Horned Owl nest, so the above data may leave the most interesting chapter of the story untold.

No. 28. *North of Middleton.*—Winter, 1929-30, to spring, 1930, 19 pellets: cottontail, 4; fox squirrel, 1; meadow mouse, 24; deer mouse, 52; flicker, 1; Coot, 1; small bird, 2.

Late fall (?), 1930, to February, 1931, 28 pellets: cottontail, 19; meadow mouse, 2; deer mouse, 54; domestic chicken, 2.

March, 1931, 8 pellets: cottontail, 7; Norway rat, 1; deer mouse, 1; flicker, 1.

April, 1931, 8 pellets: cottontail, 8; deer mouse, 4.

The Middleton data were obtained from a large unpastured woodlot surrounded by thickly settled farming country. There was a slough within a half mile of the woods. Considerable poultry was to be seen around the farm yards.

No. 29. *Southwest of Baraboo.*—Fall (?), 1930, to March, 1931, 14 pellets: cottontail, 8; meadow mouse, 16; deer mouse, 20; Ruffed Grouse, 1.

April, 1931, 31 pellets: cottontail, 27; deer mouse, 4; Ruffed Grouse, 1; small bird, 2; crayfish, 1.

The Baraboo data were secured from a range of wooded hills where wild life can be said to exist under conditions as nearly primal as any persisting in this quarter of the State. Ruffed Grouse—note the two in the 45 pellets—were conspicuously on the upward trend of their cycle, and were to be flushed almost anywhere in the woods.

No. 30. *Southwest of Lodi.*—Fall (?), 1929, to March, 1930, 41 pellets: cottontail, 17; Norway rat, 9; meadow mouse, 56; deer mouse, 25; house mouse, 1; shrew (*Blarina*), 1; small bird, 1.

No. 31. *Roxbury.*—Fall (?), 1929, to spring, 1931, 109 pellets from 4 Horned Owl territories:

Fall (?), 1929, to March, 1930, 47 pellets: cottontail, 37; fox squirrel, 1; meadow mouse, 21; deer mouse, 36; unidentified rodent, 1; shrew (*Blarina*), 2; Snow Bunting, 1; snake, 1.

April, 1930, 12 pellets: cottontail, 11; fox squirrel, 1; meadow mouse, 1.

May, 1930, 6 pellets: cottontail, 6; small bird, 1.

Late winter and early spring, 1931, 44 pellets: cottontail, 35; flying squirrel, 1; Norway rat, 1; meadow mouse, 5; deer mouse, 9; Screech Owl, 1; domestic pigeon, 1; small bird, 1.

No. 32. *Prairie du Sac.*—Fall (?), 1929, to June, 1931, 196 pellets from 3 Horned Owl territories:

Fall (?), 1929, to February, 1930, 30 pellets: cottontail, 12; Norway rat, 2; meadow mouse, 17; deer mouse, 81; unidentified mouse, 1; bluejay, 1; Ruffed Grouse, 1; quail, 2; small bird, 2.

March, 1930, 12 pellets: cottontail, 10; Norway rat, 1; Ruffed Grouse, 1.

April, 1930, 8 pellets: cottontail, 7; meadow mouse, 1; deer mouse, 3; shrew (*Blarina*), 1.

Fall (?), 1930, to March, 1931, 68 pellets: cottontail, 43; Norway rat, 6; meadow mouse, 8; deer mouse, 72; shrew (*Blarina*), 1; crow, 1; quail, 2; small bird, 5.

April, 1931, 41 pellets, partly from a tethered juvenile: cottontail (incl. 3 juvenile), 33; Norway rat, 1; deer mouse, 46; shrew (*Blarina*), 1; meadowlark, 1; crow, 2; bluejay, 1; flicker, 2; domestic chicken, 1; quail, 2; small bird, 7.

May, 1931, 24 pellets from tethered owl: cottontail (incl. 4 juvenile), 17; Norway rat, 1; meadow mouse, 2; deer mouse, 18; meadowlark, 2; Screech Owl, 1; rail, 2; medium-sized unidentified bird, 1; small bird, 8.

June, 1931, 13 pellets from tethered owl: cottontail (incl. 9 juvenile), 15; deer mouse, 3; small bird, 5.

Areas 30, 31, and 32 were of the same general topography, being more or less wooded ranges in dairy country, with occasional marshes and varying acreages in cultivation. All of the areas supported a fair population of Ruffed Grouse; no. 32 had also one of the heaviest quail populations yet studied.

An approach to a local year-round picture of Horned Owl food habits can be made by combining the no. 32 data from fall (?), 1930, to June, 1931. Contents of 146 pellets: cottontail (incl. 16 juvenile), 108; Norway rat, 8; meadow mouse, 10; deer mouse, 139; shrew (*Blarina*), 2; meadowlark, 3; crow, 3; bluejay, 1; flicker, 2; Screech Owl, 1; domestic chicken, 1; quail, 4; rail, 2; medium unidentified bird, 1; small bird, 25. Total items, 310.

Miscellaneous pellets and stomach contents: cottontail, 9; meadow mouse, 2; deer mouse, 4; house mouse, 1; meadowlark, 1; domestic chicken, 1.

Summary of Great Horned Owl Food Habits.—The Horned Owl's food habits depend largely upon where the bird is situated. While a cross-section of average food habits pertaining to a township or to a continent might be compiled, radical departures from the average are bound to result from pronounced changes in availability of prey, as evidenced by the toll upon domestic chickens in no. 21 and upon ducks in no. 24.

Changes in availability do not necessarily correspond with changes in numerical status, though the two could be roughly synonymous in the case of most mammalian and some avian prey, provided that not too many other variables—"buffers," food and cover values, weather, emergencies, etc.—upset environmental equations. The availability of Ruffed Grouse appears to increase proportionately to the increase of the grouse, whereas this principle does not appear to hold so well for quail. The Norway rat, an alien successfully maintaining itself as a permanent resident in our southern Wisconsin fields wherever conditions are right, seems even in low population densities peculiarly vulnerable to the Horned Owl in winter.

The food habits of the Horned Owl, for reasons easily understandable, have helped to incur for the species almost universal condemnation and persecution. It is evident that this predator may have an expensive appetite and that any defense of a creature which costs a community poultry or game (notably where rabbits, for all of their own injurious potentialities, are ranked as game) runs the risk of being resented as social impropriety, if not heresy. It is evident that the Horned Owl's diet would be virtually impossible to defend before a public claiming right of ownership for a large percentage of the items representd, an indefensible diet perhaps from the immediate material standpoint. Not so evident is the Horned Owl's full significance in what we are pleased to designate the economy of nature. The mere fact that certain life phenomena are not readily fathomable from the surface does not detract from the possibility of their being of equal, or of greater, magnitude than those we suppose to be obvious.

Just what is the import of the 5 weasels in the past year's collection of less than 800 Horned Owl pellets—pellets from three counties in which the weasel population as a whole was not noticeably excessive? This season I also found circumstantial

evidence of a Horned Owl having brought tragedy to a family of young Cooper Hawks, and another site where an adult Cooper Hawk had been eaten in typical Horned Owl manner. I have witnessed, too, the utterly crazed behavior of a mother Cooper Hawk on account of a Horned Owl which had chanced to trespass into her nesting territory. Are these fragmentary data worthy of casual mention only, or do they hint the functioning of a powerful natural mechanism which we either do not recognize or ignore? May they link, for example, the apparent ascendency of weasels and Accipiters with the decline of large raptors in the eastern United States? I do not imply that I know.

Nor do I imply that Horned Owl pressure, under virgin conditions or elsewhere, serves as an adequate check, *in itself*, upon the increase of weasels and Accipiters. Such pressure, nevertheless, added to other environmental pressures might be strongly enough contributory to lower the population level at which the aggregate of checks, organic and inorganic, becomes dominantly operative. Nor do I imply, even were the Horned Owl to prove the major influence in the control of important species tending in spite of man to multiply to serious proportions, that we should lose sight of other sides to the question. I am not attempting recommendations except that we, who undertake what we hope is sound management of wild life resources, strive to wean ourselves from narrow interests and rule-of-thumb methods.

The whole subject of predator and prey-inter-relationships is very obscure; to no predatory species does this generalization appear better applicable than to the Horned Owl. We have some data relating to this species which are good so far as they go. We have some data, yes, but we must admit that we have only the most elementary of ideas as to their ecological meaning. Here is room for research.

Adverse effect of the Horned Owl upon quail: ordinarily a light, constant pressure, rather predictable under uniform conditions, though occasional coveys (as the ones preyed upon by the owls of no. 24) suffer severe losses. In the Wisconsin observational areas, Horned Owls living in the midst (within ¼ mile) of quail populations of around 50 birds averaged one kill about every two months (see Errington, 1931b). With lesser quail populations and at greater distances from the owl headquarters the mortality rate diminished perceptibly. I suspect, from the few data I have upon the topic, that most bob-white kills by Horned Owls are brought about through exposure of coveys night-flushed by mammals (experimental evidence indicates that quail have no fear of rabbits, however), a conception in essential agreement with Stoddard's (1931) views from his Georgia work. I have never been able to detect any correlation between poor physical condition in a quail and the likelihood of its falling prey to a Horned Owl, as in the case of the Red-tailed Hawk (see Errington, 1930b, 1931b, 1931c).

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University of Wisconsin, Madison, March 21, 1932.

THE MARYLAND HAWK BOUNTY

By A. BRAZIER HOWELL

Some day there will be written the complete history of the hawk and owl bounties that have been in operation in our various states, but at present one must content himself with informative glimpses here and there as the data, not always easy to secure, become available. In this connection the case of Maryland is of interest, and of particular application in that it is very recent. While Maryland is perhaps not at the exact geographical center of our ornithologist population, it is situated in a straight line between, and not distant from, New York and Washington, allegedly our two greatest foci of avian conservation.

By authorization of the state legislature, bounties on hawks were paid in Maryland from the years 1918 to 1930 inclusive, at the rate of 50 cents each. The numbers of hawks presented for bounty payment and the amounts so paid were kindly furnished me by Mr. E. Lee LeCompte, the efficient State Game Warden of Maryland. It should be noted that in this list there is a duplication of nine months and omission of five.

Date	Hawks	Price
June 1, 1918, to December 31, 1918	7	$ 3.50
June 1, 1919, to December 31, 1919	67	33.50
October 1, 1919, to December 1, 1920	382	191.00
October 1, 1920, to September 30, 1921	373	186.50
October 1, 1921, to September 30, 1922	4,089	2,044.50
October 1, 1922, to September 30, 1923	8,000	4,000.00
October 1, 1923, to December 30, 1924	20,081	10.040.50
October 1, 1924, to September 30, 1925	19,374	9,687.00
October 1, 1925, to September 30, 1926	14,358	7,179.00
October 1, 1926, to September 30, 1927	13,029	6,514.50
October 1, 1927, to September 30, 1928	8,504	4,252.00
October 1, 1928, to September 30, 1929	14,539	7,269.50
October 1, 1929, to September 30, 1930	22,283	11,141.50
Totals	125,086	$62,543.00

The law, as passed, was to apply to Sharp-shinned and Cooper hawks only, but until 1927 the bounties were paid by justices of the peace. Needless to say, it is likely that none of these gentlemen could properly distinguish one hawk from another, so it seems certain that bounties were paid not alone on every sort of hawk, but doubtless on some other birds as well. Under this system, however, abuses became so evident that it was decided that bounties should be paid only through the office of the State Game Warden, and this plan was adopted in 1927. It is significant that immediately great lamentation arose in certain quarters because Mr. LeCompte refused to pay bounties on heads of the highly beneficial Sparrow Hawk that were sent in.

There is more of interest in the above tabulation than meets the eye, however. In the five years from 1926 to 1930, inclusive, bounties totalling $36,356.50 were paid by the state on 72,713 hawks. Of these, 40,003, or 55 per cent, were turned in by residents of Dorchester County. This is due to the fact that during the fall months migrating hawks by the thousands stop for the purpose of obtaining a brief rest in the lower sections of this county, which the majority of them doubtless leave within 24 hours. Many of the natives of this section have made a regular and profitable business of hawk hunting; and during 1930 one individual profited thereby to the astonishing extent of $900.00.

The repeal of the provision for the payment of hawk bounties in Maryland was undoubtedly attributable to the efforts of Mr. LeCompte. But in accomplishing this

it would have been useless to advance the argument that destruction of hawks by offering a bounty is economically unsound. In fact there was strong opposition to repeal of the bounty provision offered by some of the state senators on the ground that this was one of the most valuable features of the game laws. Another argument advanced was that one of the chief sources of individual revenue of some persons, particularly in Dorchester County, would be taken away under the repeal of the hawk bounty.

The argument that won the day was that during 1929-30 the state paid the residents of Dorchester County $6,817.00 for 13,634 hawks, while but $5,742.75 for hunting licenses was paid by the residents of that county.

My attention was attracted, by brief notices in the press, to this measure during its passage through the state legislature. I thereupon wrote a number of letters in its behalf, including pleas to Drs. Pearson and Palmer, both of whom stated that they would also write similar letters to members of the legislature.

To me the outstanding point in the above statement is not that for thirteen years one of our oldest states, in a geographical position best fitted to profit by expert advice on wild life matters, has not only encouraged, but has been permitted to encourage, the destruction of thousands upon thousands of beneficial hawks breeding in every eastern state north of the Mason and Dixon line. The discouraging feature appears to be the fact that for the thirteen years that this has been occurring there has been no protest by any ornithologist or ornithological organization of sufficient loudness or decisiveness to have been heard. I regretfully admit that I have been as delinquent in this regard as anyone else.

Surely it is not unreasonable to expect that our ornithological organizations, presumably most concerned with the welfare of economically valuable birds, might, through committees, acquaint us in regard to such retrogressive steps as bounty laws, and this before they have been in force for thirteen years. How many of our ornithologists know what other states now have laws providing for the payment of bounties on hawks? How many care sufficiently to enquire?

Johns Hopkins Medical School, Baltimore, March 26, 1932.

FROM FIELD AND STUDY

Waxwings Eating Spoiled Fruits.—On February 23 of this year, Mr. Robert Fowler, one of my students, brought me a paper bag containing ten Cedar Waxwings (*Bombycilla cedrorum*). These birds with fifteen others had been picked up underneath an ornamental date palm (*Phoenix Canariensis*) at his home in Los Angeles, California. The following day seventeen more were brought in from the same spot, making a total of forty-two birds from a flock estimated at two hundred. Mr. Fowler reported that the birds fell out of the tree, fluttered and gasped a moment, and then died. Some observers stated that they were choked to death in an effort to swallow the fruits of the date. This, of course, was impossible, but the birds were evidently consuming the flesh of the fruit.

Stomach examination showed plant tissues ascribed to the date; fruits had been picked into. A sticky fluid smelling of fermented fruit ran from the mouths of many of the birds and had smeared their feathers. The birds were all excessively fat. Examination for internal parasites was made by Dr. Gordon Ball, with negative results. Dissection showed marked congestion in the head region, but no other lesion was noted. Fruits were examined by Dr. O. A. Plunkett for poisonous fungi, but no unusual forms were found. No form of spray had been applied to the trees of the vicinity and there would be no reason to spray these valueless fruits. Tests for mineral poisons were not made. The cause of death then remains unproven, though the following hypothesis offers possibilities.

Ripe fruits of the ornamental date remain on the tree for considerable periods of time. The weather preceding the occurrence had been very wet for a long period of time. Fermentation changes in the tannin and sugars normal in these fruits could readily have produced some toxic alcohols or other complex organic compounds that would result in acute poisoning. Ordinary ethyl alcohol would be the product naturally expected of such fermentation, but such high mortality would hardly be expected from this alcohol.

A count of the birds showed 30 per cent had wax tips on the secondaries and none on the tail feathers.—LOYE MILLER, *University of California at Los Angeles, California, May 10, 1932.*

Forehandedness of California Jays Begins Early.—At Woodacre (Marin County, California) jays are rather scarce at the present time, for many small boys wage persistent, and some of their elders occasional, warfare upon these birds. In spite of this, however, in the spring of 1929 a pair of Northwestern California Jays (*Aphelocoma californica oöcleptica*) succeeded in raising a brood near my cottage at Woodacre Lodge, and the youngsters, after leaving the nest, soon discovered that they were not interfered with inside of my half-acre enclosure.

It was on June 1 that these birds came under my observation, when they were noticed in an old pear tree where they appeared to be finding something to their taste among the gray moss (*Ramalina reticulata*) drooping from the branches. Visiting the place only on week-ends, I did not know just what went on between times; but by the end of the following week—that is, June 8—the youngsters were noticeably able to fly with something like ease and had acquired a vocabulary of some of the unmusical sounds that their immediate relatives delighted in producing. They also seemed to have reached the stage when parental supervision was no longer exercised, or perhaps their parents had been "potted" by the small boy, but they had not yet learned fear of mankind.

On June 9 I placed on the feed table some moistened crumbs of stale bread and in a short while noticed the young jays helping themselves to the offering. The next day more bread was put on the table, dry and in small pieces, and was readily accepted. In fact, it was practically demanded. By noontime on this day the youngsters looked considerably over-stuffed. However, they turned their youthful energies for a while in other directions, returning occasionally to gobble and stuff themselves as before and paying no attention to their host, who was doing some gardening work a few yards from the table. While watching my guests in one of my resting spells, I was surprised to see that they had changed their tactics and that one after another, often

two at a time, would grab a small chunk of bread, fly with it to the ground and carefully hide it from sight, either among the short grass, under dead leaves or under a bit of bark, and immediately return to the table for more provender to put in storage. Occasionally pausing to worry a little more of the bread down their throats, the birds kept up these prudential activities until all of the smaller bits of bread were stowed away and only a rather large piece of the heel of the loaf was left. This they tried also to carry away, but got it no further than the edge of the table, when it fell to the ground and was abandoned.

During this performance constant lookout was kept on my part for the appearance of an adult bird, or for some raucous sound denoting the nearby presence of one, but to no avail. I even watched for a while from behind a screen on the cottage porch with no resulting approach of a parent, aunt, cousin or other relative. When first observed these young jays seemed to be too freshly out of the nest to be able to put into practice anything much in the way of example set them by their elders, and when next observed, after an interval of four days, they again were unattended by a parent. This being the case, when or how did the youngsters learn the storage scheme? *Did* they learn it, or was it just instinct?—JOSEPH MAILLIARD, *California Academy of Sciences, San Francisco, California, March 19, 1932.*

Winter Occurrence of the Townsend Warbler at Portland, Oregon.—On January 13, 1928, a much-emaciated Townsend Warbler (*Dendroica townsendi*) was found dead on one of the city streets of Portland (Pacific Coast Avifauna, No. 19, 1929, p. 40) and reported as the first winter record available at that time. Since then, Miss Maude Ragon of the local Audubon Society brought another adult male to the writer on January 12, 1931; and the third, also a male, was found dead in the same part of the city on January 13, 1932, by Miss Ruth Russell, who also found the specimen in 1928. It is interesting to note that the three winter records of the occurrence of this warbler in Oregon should be reported on January 13, 1928, January 12, 1931, and January 13, 1932, all three by Miss Ragon and Miss Russell.—STANLEY G. JEWETT, *Portland, Oregon, January 16, 1932.*

Bird Notes from Santa Cruz Island.—On February 20, 1932, I saw a Short-billed Gull (*Larus canus brachyrhynchus*) in immature plumage at Pelican Harbor, Santa Cruz Island, and on March 6, four Short-billed Gulls, three immature and one adult, in Prisoner's Harbor on Santa Cruz Island. The only published record for this bird from the Channel Islands is that of three individuals taken at Catalina, February 11, 1910, by A. van Rossem.

On March 5, 1932, I saw a Townsend Solitaire (*Myadestes townsendi*) on the ridge above Pelican Harbor.

Mr. Fred Caire reports a flock of about one hundred and fifty Band-tailed Pigeons (*Columba fasciata*) at the main ranch on Santa Cruz Island. He states that he has seen band-tails once before on the island, but there are no records for either the Band-tailed Pigeon or the Townsend Solitaire in Howell's list. Both species have been present in Santa Barbara this winter in unusual numbers, and nearer the sea than the writer has ever before seen them.

The writer noted Varied Thrushes (*Ixoreus naevius naevius*) near Pelican Harbor on Santa Cruz Island on February 21, 1932. A specimen, proving of this subspecies, was taken by Harry H. Sheldon at the main ranch on March 5.—RALPH HOFFMANN, *Santa Barbara, California, March 11, 1932.*

The Townsend Solitaire in San Francisco.—The severity of the present winter has driven many boreal birds to low elevations, resulting in a number of "record" observations in California lowlands. My twenty-five foot wide garden at 1879 Broadway, San Francisco, received its share of winter visitants. Here two large berry bushes (*Pyracantha crenulata* var. *yunnanensis*), whose fruit has always been a source of attraction to seed-eating species, were particularly so this winter due to an unusually heavy crop.

Ordinarily no more than a few Western Robins and Gambel and Song sparrows visit our 25 by 40 foot garden in the course of a winter. Yet on January 1, 1932, the following individuals and species were noted throughout the day; and many of them remained for more than a month, until every berry was stripped from the bushes: 1 Barlow Chickadee, 6 Western Robins, 3 Pacific Varied Thrushes, 4 Dwarf Hermit

Thrushes, 3 Cedar Waxwings, 5 California Purple Finches, 2 California Linnets, 6 Gambel Sparrows, 2 Valdez Fox Sparrows, and 4 Santa Cruz Song Sparrows, which latter along with the linnets were probably resident birds. This list certainly represents an unusual concentration of birds for the size of the area, apparently caused, in all cases except that of the chickadee, by an abundance of one kind of food supply.

Most noteworthy among the winter visitants, however, was a single Townsend Solitaire (*Myadestes townsendi*) that spent most of the day, December 29, 1931, in

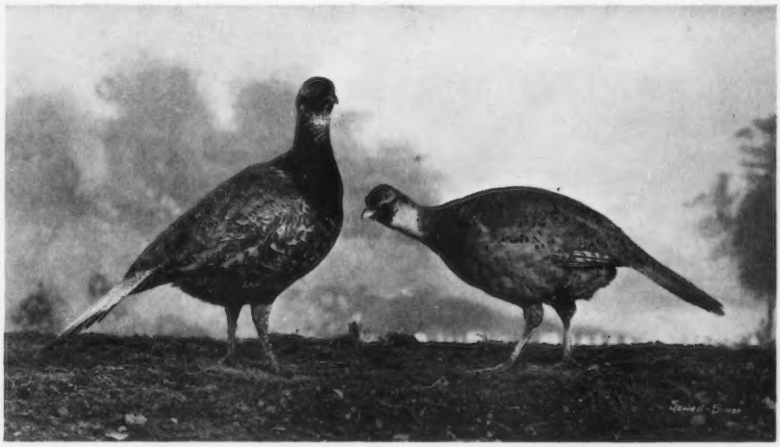

Fig. 21. HYBRIDS, *Phasianus* × *Dendragapus*.

my garden where close inspection and positive identification were afforded. This species was not noted again until January 23, 1932, when the (same?) bird was viewed at close quarters in my mother's back yard, 1818 Broadway, directly across the street from my house. If the latter was the same individual I noted in December (and the rarity of the species in this region suggests such to be the case), then continual winter residence of nearly a month at least, is to be inferred.

Reference to *The Condor* files, and to Grinnell and Wythe (Pac. Coast Avif, No. 18, 1927, p. 146), fails to provide a record of the Solitaire's occurrence in this county, though it has been noted rarely in the adjacent ones as an irregular mid-winter visitant.—JAMES MOFFITT, *1879 Broadway, San Francisco, California, February 16, 1932.*

An Unusual Gallinaceous Hybrid.—Through the courtesy of Mr. E. F. Gonty, Portland taxidermist, there has come into my hands a beautifully-mounted pair of gallinaceous hybrids, evidently *Phasianus colchicus torquatus* × *Dendragapus obscurus fuliginosus*.

About twenty years ago, while hunting pheasants in Yamhill County, Oregon, a Dr. Montgomery and Mr. Chas. J. Cook of Portland, Oregon, flushed a flock of these birds, four being killed at the time. These four birds were brought to Portland, where two were mounted for the Oregon State Game Commission and two retained at the taxidermy shop of the late W. H. Baker in Portland. Prior to Mr. Baker's death, his birds, male and female, were promised me and came into my possession during April, 1932. One of the original four is still in the office of the Oregon State Game Commission in Portland, Oregon, and the fourth cannot now be located.

No other record of the occurrence of this hybrid has been reported since the original capture of these four birds. The accompanying illustration (fig. 21) shows plainly the mixture of *Phasianus* and *Dendragapus*.—STANLEY G. JEWETT, *Portland, Oregon, April 22, 1932.*

Bird Notes from Tehama County, California.—During a short stay by the writers and Mr. Henry S. Fitch at Red Bluff, Tehama County, March 31 to April 2, 1932, field trips were made in the vicinity of that town and in the Mount Lassen region. Observations of the birds in that area were made and some collecting was done.

A reference to Grinnell, Dixon and Linsdale's Vertebrate Natural History of the Lassen Peak Region (Univ. Calif. Publ. Zool., 35, 1930) has shown that records of two new birds for the region were obtained by us, as well as a number of early migration dates for various species. These records were all obtained at Red Bluff, Dale's (fifteen miles northeast of Red Bluff), or in the interlying area.

Lawrence Goldfinch (*Spinus lawrencei*). Two were seen (male and female) near a small lake, one and one-half miles north of Dale's, Tehama County, April 1, 1932. The female, with gonads in breeding condition, was collected by DuMont and the specimen is now in Stevenson's collection.

American Egret (*Casmerodius albus egretta*). Two were seen at a small marsh four miles northeast of Red Bluff, April 2, 1932. These two birds were new to the region.

Oregon Vesper Sparrow (*Pooecetes gramineus affinis*). Six or seven were seen four miles northeast of Red Bluff, March 31, 1932, and two males were collected by Stevenson.

Alaska Myrtle Warbler (*Dendroica coronata hooveri*). One was collected at Dale's, April 1, 1932, by DuMont.

The presence of species noted by us that apparently constitute early migration records for the region are: Band-tailed Pigeon (*Columba fasciata fasciata*), a flock of twelve at Red Bluff, March 31; Greater Yellow-legs (*Totanus melanoleucus*), two at a pond one and one-half miles north of Dale's, April 1; Nighthawk, probably *Chordeiles acutipennis texensis*, one flying over the Sacramento River at Red Bluff, April 1; Western Kingbird (*Tyrannus verticalis*), one seen eight miles northeast of Red Bluff on March 31; Violet-green Swallow (*Tachycineta thalassina lepida*), six or eight seen near Red Bluff, March 31; Tree Swallow (*Iridoprocne bicolor*), between twenty and thirty found flying over the lake near Dale's on April 1; Western Gnatcatcher (*Polioptila caerulea amoenissima*), one taken at Dale's, April 1; Cassin Vireo (*Vireo solitarius cassinii*), one collected at Dale's on April 1; Lutescent Warbler (*Vermivora celata lutescens*), found at Dale's, April 1.

Other observations include a Whistling Swan (*Cygnus columbianus*) found dead at the lake north of Dale's on April 1, and a Sonoma California Thrasher (*Toxostoma redivivum sonomae*) seen at Red Bluff on the same date.—PHILIP A. DUMONT and JAMES STEVENSON, *Museum of Vertebrate Zoology, University of California, Berkeley, May 1, 1932.*

A Winter Record of the Painted Redstart in Arizona.—The Painted Redstart (*Setophaga picta*) seems to be a rare winter resident in Arizona. A. B. Howell has reported seeing one in the Catalina Mountains, February 9, 1915 (Condor, XVIII, 1916, p. 213), but I have found no other published records.

While in Arizona last December with Drs. Loye Miller and Alden H. Miller, I was fortunate enough to observe a bird of this species. In the same grove of trees in Peña Blanca Cañon, Santa Cruz County, Arizona, where we found these birds the previous August, I saw one flitting about. As I watched, it flew over to a large column of rock and fluttered against the perpendicular surface until it gained a hold. It remained there only an instant and then flew back to the scrub oaks near-by. This performance was repeated. I shot at the bird and missed, and although it stayed in the vicinity, I was unable to get another shot. The next day, as we were driving by, I suggested that we stop to see if we could collect the bird; within several minutes, Alden Miller had bagged it. It was a male, apparently normal in every respect. The bird was skinned and is now number 1213 in his collection.

In summer this bird seems fairly rare in this area, for we saw only one in the week or so that we collected. The altitude there is about 4000 feet—live oak, walnut, grass-land association.—BERRY CAMPBELL, *138 N. Poppy Street, Monrovia, California, May 9, 1932.*

The Baikal Teal Taken in California.—The State of California Division of Fish and Game received a communication from Mr. Frederick M. Johnson, San Mateo, California, on December 15, 1931, advising that on December 13 Mr. Johnson had killed a male Baikal Teal (*Nettion formosum*) on the grounds of the Toyon Duck Club, near Brentwood, Contra Costa County, California. Mr. Johnson further advised that the bird was flying with a flock of American Pintail (*Dafila acuta tzitzihoa*) when shot and appeared to be the only teal in the flock.

Mr. Johnson had the specimen preserved by Mr. Lockwood, of San Bruno, California, where I inspected it on January 8, 1932, and verified his identification. The specimen is one of an adult bird in nearly full plumage. Its wings and tail feathers are in perfect condition and do not show any excessive wear that might be expected if the specimen were an escaped aviary bird. Neither do the feet or soles show the usual thickening of captured birds. The specimen has every appearance of a wild bird, which I believe it was.

I wrote Mr. Johnson on January 8 in further regard to this specimen and suggested he present it to the Museum of Vertebrate Zoology for permanent preservation. This, I am very pleased to state, Mr. Johnson has generously agreed to do and the specimen will doubtless be catalogued there by the time this note appears in print.

Mr. Johnson wrote me on January 9, 1932, as follows:

"I had thought of the possibility of this bird being an escaped caged duck, but Mr. Nelson who takes care of the DeLaveaga collection [San Mateo, California] told me that to the best of his knowledge, Mr. DeLaveaga had the only four birds of this species in this country, and I saw all four in one of the pens. On top of this, our keeper at the Toyon Club told me that 'another duck that looked just like the one I killed' had been taken the next day. He, unfortunately, dressed the bird and put it with the rest of the bag, so I was unable to secure the specimen. There were thousands of northern birds on our grounds at the time, and the fact that there were two of this species killed in two days makes me believe that there is a great possibility that there were a few more around. I intend to watch very carefully next year and attempt to secure another specimen."

The A.O.U. Check-list, 4th ed., 1931, p. 48, provides but one record of this species' occurrence on the North American continent, that of a single male specimen secured by A. M. Bailey, at Wainwright, Alaska, September 2, 1921 (Bailey, Condor, XXVII, 1925, p. 169). Therefore the occurrence of this Asiatic species so far south on the Pacific Coast of North America is noteworthy.—JAMES MOFFITT, *Division of Fish and Game, 510 Russ Building, San Francisco, California, February 8, 1932.*

An Unrecorded Nesting Colony of Yellow-billed Magpies.—On April 3, 1932, while driving on the main road from Hornitos to Mariposa, Mariposa County, California, several Yellow-billed Magpies (*Pica nuttallii*) were seen two miles east of Hornitos, at an elevation of 1200 feet. On April 10, 1932, I returned to the vicinity with Mr. Ralph Anderson, Government photographer for Yosemite National Park, to gather more information on the colony. On that date we located twenty-two nests and saw at least as many magpies. All of the nests found were in the large Valley Oaks, *Quercus lobata*, which grow abundantly over the rolling hills in this region. Most of the trees chosen for nesting sites were the largest trees in the vicinity. The nests were located in the tops of these large oaks or near the ends of the branches, so that it proved difficult to climb to them. Magpies were seen in and about the trees containing nests and one was twice seen to enter a nest where the bird remained a few minutes. A small stream flows through the center of the colony but this dries up a little later in the season.

Mr. Chris Peterson, who owns a ranch upon which part of the colony is located, told us that he has lived there sixty-three years and that the colony has been there at least that long. He estimated the birds in the colony at two hundred and said that he knew of no other nesting magpies in the vicinity.

As far as I can learn this is the first time that Yellow-billed Magpies have been recorded from Mariposa County. It is encouraging that this colony occupies a sparsely settled region where the birds apparently can do little damage and will probably not be persecuted.—A. E. BORELL, *Ranger-Naturalist, Yosemite National Park, California, April 13, 1932.*

Surf Birds and Bonaparte Gulls at San Diego.—As the Surf Bird (*Aphriza virgata*) has the reputation of being a rare bird, it may be worthy of note that on April 17, 1932, as I was passing the jetty at the entrance to San Diego harbor in my motorboat, I saw no less than seventeen of these birds on the rocks of the jetty. They were in two groups of ten and seven, respectively. There may have been more of the birds out of sight, but these seventeen were counted positively. A week later (April 24) I again returned to the jetty and saw five Surf Birds, two of which I secured for the San Diego Society of Natural History. Huey (Auk, 44, 1927, pp. 529-531), when he observed record-breaking numbers of Surf Birds at San Felipe, Lower California, Mexico, designated April 16 as the peak of the migration. My observation of April 17 at San Diego falls in the same general period.

On the April 17 date, I also observed at sea, a short distance from Point Loma, the largest number of Bonaparte Gulls (*Larus philadelphia*) that I have ever seen. They numbered at least 750 individuals, all of which stayed together in one flock, following each other almost like sandpipers. These Bonaparte Gulls were in addition to about one hundred which I had previously seen in San Diego harbor. All were in bright nuptial plumage. On April 24, only a few scattering Bonaparte Gulls were noted.—J. W. SEFTON, JR., *San Diego Society of Natural History, Balboa Park, San Diego, California, April 26, 1932.*

A White Steller Jay at Big Creek, Fresno County, California.—We were surprised on the morning of September 16, 1931, to see an abnormally plumaged Blue-fronted Jay (*Cyanocitta stelleri frontalis*) which came about our house in Big Creek. The back, upper breast and crest of this bird were grayish white, the rump and belly were bluish white, and the legs and beak creamy white. When the bird came to a nearby pine branch and permitted close inspection, we could see that its eyes appeared to be black. When it flew, two long feathers in the center of the tail showed a pale blue color. For the next two months the bird was seen, always alone, around Big Creek. Next it was seen at the Power House, ten miles down the cañon.—CATHERINE E. BOWER, *Box 96, Big Creek, California, March 31, 1932.*

EDITORIAL NOTES AND NEWS

While Cooper Club finances can be announced as in good condition, considering the times, there has been some reduction in income. The Business Managers of the Club, Messrs. W. Lee Chambers and John McB. Robertson, it should be known to everyone, do all the routine of the Club business on their own spare time. No one connected with the Cooper Club or with its publications receives any money as compensation for the services he renders. Two ways in which Club members can make the task of our officers easy and, at the same time, save the Club expense in postage and supplies are as follows: First, payment of dues promptly—all dues for the current year are payable January 1, and close figuring is made necessary in planning how much money can be spent on our publications during the year. A second way to help is by not ordering change of address if it is only for a vacation or other short period; but instead, leave three or four cents at the Post Office and have *The Condor* forwarded to your temporary address. However, any permanent change of address should be made known promptly to one of the Business Managers. If notification is not given promptly, *The Condor* is returned to the business office, postage due, and then must be re-mailed when the new address is provided. In other words, postage may have to be paid three times instead of once!

Hereafter, to save postage and other "overhead" the editors of *The Condor* will not acknowledge receipt of articles submitted for publication, unless especially asked to do so. But we will continue to send proofs of all articles, short or long, to authors.

On March 10 of this year an expedition started out from the California Academy of Sciences, sponsored by Mr. Templeton Crocker of San Francisco, for the purpose of visiting and scientifically exploring various islands off the Pacific coast of Mexico, Central America, and Ecuador. Mr. Crocker furnished his private yacht, *Zaca*, and equipped it appropriately for

scientific collecting. The expedition is expected to return about August 1. Included in the party is Mr. Harry S. Swarth as Naturalist-in-Charge. Mr. Swarth is particularly interested in the land birds of the Galapagos Islands, inasmuch as he has recently published a critical study of the large collection of birds from the Galapagos, taken in 1905 and 1906, and since then contained in the Academy's museum. His technical report on this collection was published last fall (Occasional Paper No. 18, California Academy of Sciences). On the present expedition it is Mr. Swarth's aim primarily to study the habits, life histories and ecological relations of the various species of Galapagos land birds so as to be in position to contribute to a better understanding of those evolutionary processes which have resulted in the development of so many unique forms there. The classic group of Geospizids will claim his special attention.

California and other western states were visited during the month of May by Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian Institution and in charge of the National Museum. His two-day visit in the San Francisco Bay region was most profitable and pleasurable to the museum people who happened not to be away in the field and were therefore able to welcome him and participate in the informal conferences held.

Dr. Edward W. Nelson, formerly Chief of the Biological Survey, is spending the summer with his nephew, Mr. R. Leiland Nelson, 5009 Proctor Avenue, Oakland, California. Dr. Nelson has recently completed, for *The Auk*, an extended biographical account of the late Henry W. Henshaw. He is now taking up again his studies on Mexican birds and mammals, based on the field work prosecuted by him and Mr. Edward A. Goldman for many years.

PUBLICATIONS REVIEWED

HARRISSON ON THE NORMAL FLIGHT SPEEDS OF BIRDS.*—The speed at which birds fly has been a matter of much speculation so that it is valuable to have definite observations on a subject where considerable has been assumed without proper basis. In the present paper Mr. Harrisson summarizes flight records for thirty-six species of birds taken by means of speedometer readings from automobile or motorcycle when the birds observed were flying parallel with the vehicle, the speed of which was regulated to coincide with that of the bird. Observations were made in England and Wales, mostly in open country as opportunity for such studies seldom are possible in wooded or hilly sections. Effort was made in all cases to ascertain the usual speed of flight and its variation under normal conditions, instances where there was evident acceleration or retardation due to winds being rejected. The species on which records were obtained range from Rooks, Starlings, Yellow Buntings and House Martins to Tawny Owls, Ring Doves and Herring Gulls. The majority relate to passeriform birds.

In analysis of his own observations, and those of others as obtained from published records, the author considers there is some reason to believe that under the urge of the migration impulse birds may travel at speeds somewhat more rapid than under ordinary circumstances, in which he differs from Meinertzhagen, who has said that migratory flight differs very little from speed under ordinary circumstances. To substantiate his argument Harrisson compares Meinertzhagen's records for migrating Rooks which traveled 38 to 45 miles per hour with his own observations of the same species which under ordinary circumstances flew only 29 to 35 miles per hour. Similar comparisons with like average difference are made for the swallow and lapwing.

The speediest bird recorded by Harrisson in his personal observations was a Stock Dove flying at 59 miles per hour and the slowest a Herring Gull traveling at 17. The speeds of 41 and 45 miles per hour recorded for the Tawny Owl are quite surprising.

The paper closes with a bibliography of titles relating to speed in flight that will be of importance to other students. The author states that he expects later to give a summary of all that has been published on the subject, which will be awaited with interest.

The reviewer some years ago made a number of observations on flight speed from automobiles and was convinced that useful information was to be obtained by this means. It is to be hoped that Mr.

*Harrisson, T. H., On the Normal Flight Speeds of Birds. British Birds, vol. 25, no. 4, September, 1931, pp. 86-96.

Harrisson's studies in this interesting subject may continue as additional data will be valuable.—A. WETMORE.

MCATEE ON THE EFFECTIVENESS IN NATURE OF THE SO-CALLED PROTECTIVE ADAPTATIONS IN THE ANIMAL KINGDOM, CHIEFLY AS ILLUSTRATED BY THE FOOD HABITS OF NEARCTIC BIRDS.[1]—In this important contribution to ornithology in particular and to zoology in general, Mr. McAtee has made available to zoologists the results of an amazing amount of data on the food habits of Nearctic birds—data which have been accumulating in the records of the United States Biological Survey for the past forty-five years. This report should be of value to all students of natural history whether interested in vertebrates or in invertebrates.

The data presented in this report are based on records of animals identified in the stomach contents of about 80,000 Nearctic birds. The stomachs were examined in the Biological Survey and the determinations of species were made by specialists there in the various fields represented. The 80,000 stomachs represent a wide range of species of all of the families of birds occurring in the region, the birds being collected at all seasons and in practically all parts of temperate America.

The total number of identifications of animals from the stomachs, counting those of whatever degree, once for each time identified irrespective of the number of individual specimens concerned, was 237,399. Ten phyla ranging from Protozoa to Chordata were represented. The phylum Arthropoda was represented by the largest number of identifications, with 210,752, and Porifera by the smallest number, with two identifications. In no other institution in the country has such a volume of data been collected on food habits of birds. It is therefore extremely valuable to students throughout the country to have this mass of data digested, summarized, and made available for use as Mr. McAtee has done.

In his discussion of the animals used as food by birds Mr. McAtee treats each phylum separately. He has followed a uniform system throughout with the following sub-headings under each group considered: Protective Adaptations, Bird Enemies, Other Enemies, Discussion. In the phyla Protozoa, Porifera, Coelenterata, Nemathelminthes, Trochelminthes, Molluscoida, Echinodermata, which represent a relatively small per cent of the food of birds, he has treated each phylum as a unit, whereas in the phyla Arthropoda, Mollusca, and Chordata he has considered each order separately and in many cases has listed in tables the families of certain orders showing the number of identifications and the percentage of identifications among those of the entire order. He has not discriminated, however, between types of predators within each group, but has lumped them all together. His results might be somewhat different were he to consider each species of predator separately.

At the end is a useful bibliography of over 500 titles. Mr. McAtee states that these titles are chiefly those from which notes supplemental to his tabulations were gleaned. The bibliography is primarily one of predation, pertaining to literature on predatory animals and their foods, and so far as possible, entries are distributed according to the thing eaten and are arranged according to the phyla or orders to correspond with divisions of the text.

Throughout the text Mr. McAtee stresses the principle that predation is in proportion to population—that the ruling criterion in choice of food is availability, and that the so-called *protective adaptations* in animals are of little or no significance as far as the predators are concerned. Further he indicates that indiscrimination rather than discrimination in the attack upon animal food is the rule in bird predation. To quote from his summary on page 144:

"Considering bird predation alone this principle [predation in proportion to population] leads to a high degree of indiscriminancy in attack upon the whole kingdom of animal life. The combined attack of birds plus all other predators still more closely approaches complete indiscriminancy. In other words there is utilization of animals of practically every kind for food approximately in proportion to their numbers. This means that predation takes place much the same as if there were no such thing as protective adaptations. And this is only another way of saying that the phenomena classed by theorists as protective adaptations have little or no effectiveness.

"Natural Selection theories assume discrimination in the choice of prey. The

[1] Smithsonian Misc. Coll., 85, March 15, 1932, 201 pp.

principle of proportional predation so obvious from the data contained in this paper vitiates those theories for it denotes indiscrimination, the very antithesis of selection."

The above statements about the ineffectiveness of protective adaptations and about Natural Selection theories being vitiated by the evidence produced in the paper, call for a brief discussion of the evidence and its interpretation. I do not offer the following as a criticism of the value of the paper; I am merely suggesting what seems to me to be a more logical interpretation of the data presented, only as it concerns protective adaptation and Natural Selection.

If I interpret Mr. McAtee correctly he is thinking of *inter-specific* rather than *intra-specific* competition when he speaks of the ineffectiveness of protective adaptations. Inasmuch as the incipient stages in the formation of a new variety or subspecies are to be found within the population of the species, it seems that here is the place to look for the rôle, if any, that is played by Natural Selection. We should naturally expect that a species whose numbers of individuals were great would be subject to more predation than one whose numbers were small, and Mr. McAtee produces evidence to bear this out, but why should this vitiate the theories of Natural Selection?

On page 129 we find the following: "The sparrows, most persecuted of all [birds], because most available, represent almost the acme of protectively colored birds . . ."; and on page 133, "Muridae [Cricetidae] (mice and rats) are secretive, elusive animals with what would be called highly protective coloration, but this does not prevent their being the staple mammal food of birds."

These and similar examples in other groups of animals are apparently used as evidence against the theories of protective adaptations and Natural Selection. Might not the mere fact that certain species of animals are so numerous indicate that their large numbers are due in part to protective adaptations, be they color, structure, or fecundity, else they might, with their numerous enemies, be reduced to small numbers or even extinction? Certainly the rate of mortality and the rate of reproduction must be about the same, to preserve a uniform number of individuals which make up the species. Furthermore, granting that these abundant forms which are supposed to be protectively adapted are eaten in greater numbers than species which occur in lesser numbers, and which are perhaps less protectively adapted, I fail to find convincing evidence to indicate that the *per cent* of the total population of the species eaten is as great or greater in the species with the greater numbers. It seems to me that it is important to know the ratios of individuals eaten to the total population of the species before one uses this as critical evidence one way or the other.

That birds tend to be indiscriminate in their attack upon animal life, as far as food species are concerned, is shown by Mr. McAtee, but that they are indiscriminate as far as individuals within a species are concerned is not, I believe, shown by his data. Mr. McAtee cites Pearl on "Relative Conspicuousness of Barred and Self-colored Fowls" (Amer. Nat., 45, 1911, pp. 107-117) as evidence against the theory of protective coloration. Pearl reported that "natural enemies" captured in one year 325 individuals out of a total of 3443, a flock which contained both barred and self-colored fowls. To quote again from McAtee, page 131, "By all theories of protective coloration, the latter [self-colored fowls] are the more conspicuous and should pay a higher toll to predatory enemies. Of the total number of birds 10.05 per cent were self-colored and of all the eliminated birds 10.77 per cent were self-colored. Thus these monochrome birds were taken almost exactly in proportion to their numbers in the whole flock." As a matter of fact the self-colored birds did pay a slightly higher toll. This difference, although slight, if it were found in nature and continued over a sufficient period of time might be sufficient to cause the extinction of the one variety and the perpetuation of the other, assuming, of course, that all other conditions were equal in the two varieties. At any rate I cannot see that this is conclusive evidence against the theory of protective adaptation. It is an experiment carried on under artificial conditions over a short period of six months and the only factor considered was color. Might not there have been other factors, such as alertness, speed in retreating from enemies, or pugnacity on the part of the fowls being preyed upon, which were quite as important as color?

The reader should not be misled by the positive manner in which Mr. McAtee attempts to force his point throughout the paper. He denounces emphatically the theories of protective adaptations and

Natural Selection, but offers no alternative explanations in their stead. If we are to discard these theories, as Mr. McAtee would have us do, we should appreciate having him give us substitutes as good or better than the ones discarded.—WILLIAM HENRY BURT.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MARCH. — The March meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 24, 1932, at 8:00 p. m. in Room 2003, Life Sciences Building, Berkeley, with President Linsdale in the chair and about fifty members and guests present. Minutes of the Northern Division for February were read and approved. Minutes of the Southern Division for February were read. Mervyn Annis Ortez, 2127 Oregon St., Berkeley, was proposed for membership by Joseph S. Dixon; and Mrs. Elizabeth H. Price, 2243 College Ave., Berkeley, by E. L. Sumner through the Western Bird-banding Association.

Dr. Linsdale announced the appointment of the Committee on Conservation authorized by action of the January meeting, the personnel being Brighton C. Cain, Alden H. Miller, and W. I. Follett, chairman. Dr. and Mrs. Lynds Jones of Oberlin, Ohio, were the Club's guests for the evening.

Miss Rinehart reported a Mockingbird in full song at the California Nursery, Niles, on March 23, and a flock of Evening Grosbeaks seen at Kentfield, Marin County, on March 7. Mr. Grinnell asked whether anyone could contribute an observation which would make it possible to add the Evening Grosbeak to the list of Campus birds. Alden Miller replied that in October, 1931, he saw two of these birds on the University grounds near the Life Sciences Building. Mrs. Mead told of seeing about fifty Swans, in three flocks, from the railway train between Chico and Marysville on February 22. Miss Sherman reported a Northern Flicker at her feeding table in Oakland. Mr. Grinnell told of noting a Warbling Vireo in Faculty Glade on March 22. Mrs. Bracelin reported seeing a Saw-whet Owl near the Point Bonita target station, and a flock of about one hundred Cliff Swallows on a barn near the San Rafael ferry.

Mr. Raymond M. Gilmore then gave a most interesting, illustrated talk upon his summer cruise of the west coast of Alaska aboard the coast guard cutter "Northland." His trip occupied the period from May 5 to November 15, so he became familiar with many species of northern birds, whose habits he described entertainingly. Incidentally, he told also something of the habits of the Eskimo.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

APRIL.—The April meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, April 28, 1932, at 8:00 p. m., in Room 2003, Life Sciences Building, Berkeley, with President Linsdale in the chair and about sixty members and guests present. Minutes of the Northern Division for March were read and approved. The name of Paul Lester Errington, University of Wisconsin, Madison, Wisconsin, was proposed for membership by J. Grinnell.

At the request of the Chairman, Mr. Alden Miller reported upon the Annual meeting of the Club, held in Los Angeles, April 22 and 23. Mr. E. L. Sumner told of banding a Forbush Sparrow in Strawberry Cañon on the morning of April 28. Mrs. Bracelin announced that Mr. Joseph Mailliard had reported a Cardinal as seen by Mr. Tose in Golden Gate Park on April 27. Mr. Bunker requested an explanation as to why a Golden-crowned Sparrow in his garden should give the "oh-dear-me" call when about to spar with a Nuttall Sparrow, but no explanation was forthcoming. Alden Miller stated that on April 17 his wife found a Lutescent Warbler's nest in Strawberry Cañon, containing five eggs. Mrs. Kelly told of seeing a Mallard's nest in a eucalyptus tree in Golden Gate Park. The nest was discovered in a crotch of the tree ten or twelve feet above the ground, and at the time of the discovery, April 23, the head of the female was seen over the nest rim.

Following the discussion of field notes, Dr. Carl P. Russell of the National Park Service gave a talk upon "The Yellowstone Museum Program." This exposition of the admirable work being done by the Park Service for the benefit of the thousands of summer visitors was illustrated with an excellent series of slides.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

SOUTHERN DIVISION

MARCH. — The March meeting of the Southern Division of the Cooper Ornithological Club was held Tuesday, March 29, 1932, at 8 p. m., in the Los Angeles Museum, Exposition Park, Los Angeles, with President Michener in the chair, and about twenty-five members and guests present. Minutes of the Southern Division were read and approved. Minutes of the Northern Division were read.

Attention of the meeting was called to the announcement of the death of Mr. G. Frean Morcom. It was moved that a committee be appointed to draw up resolutions of sympathy to be placed in the minutes and a copy forwarded to the family. The motion was duly seconded and unanimously passed by a rising vote. President Michener appointed Mr. Howard Robertson, Mr. Will Judson, and Mr. W. L. Chambers as the committee. It was moved, seconded, and passed that a copy of the resolution be forwarded to the secretary.

President Michener called the attention of the Club to an open letter concerning its participation in educational and legislative action for the protection of hawks and owls. It was suggested that the Cooper Club, a scientific organization, should not be drawn into controversial activities, although the entrance of members of the organization as individuals might be advocated.

It was moved by Mr. Robertson, and duly seconded, that the April meeting of the Southern Division be vacated and the members join the activities of the annual meeting. Motion passed. The membership of the local committee for the annual meeting was again announced: Mr. W. L. Chambers, ways and means; Mr. Harry Harris, arrangements; Mr. George Willett, meeting place.

Mr. Willett announced the Say Phoebe nesting, with young birds in the nest, Horned Larks with fresh eggs, and the Myrtle Warbler in San Diego in spring plumage. He also reported that the tern islands in Salton Sea, Imperial County, are private holdings and that any evident great anxiety to incorporate these areas in the proposed reservation might make their price prohibitive; he mentioned the fact that a shelter has been erected on the first of the islands. From all information it appears exceedingly doubtful that the islands will ever be included in the proposed reservation. A rise of water level in the lake has been rumored, but no evidences of such a rise were anywhere observable. Mr. Willett also reported that no terns were sighted, but that Snowy Egrets were numerous, in fact more were seen at one time than ever before in his life, thirty to forty having been observed in one little arm of the sea with a possibility of a breeding colony at the southern end. Buffle-head, Red-head, Mallard and Pintail were present, as was also a large raft of White Pelicans and some cormorants. It was suggested that a study of spring and fall migrations and of breeding seasons in this locality would be productive of much valuable data, and that few other areas in California offer so many opportunities for research.

Mr. van Rossem reported having spent a week in the tule marshes at the southern end of Salton Sea in a search for Clapper Rails. They were heard but none was seen. Tule Wrens were nesting in great numbers; fifty occupied nests and a great many dummy nests were found and a visitor was never out of sight of singing males. Thousands of Cinnamon Teal were present, many in pairs, making up about 90 per cent of the ducks. A few Shovellers and Baldpates were present, and about forty to fifty Egrets. Very little shooting was going on, although there have been persistent rumors to the contrary. A few shots were heard, but these were probably fired by farmers driving ducks out of their fields. Mr. Chambers described a visit to the same region in search of Egrets, and mentioned the great size of the tules, the very deep mud, and the oppressive heat as obstacles to a thorough knowledge of the tule marsh areas.

Mr. Willett reported some of the difficulties encountered in revising his list of the birds of southern California. Many once common species are now rare, and some, formerly thought to be rare, are now apparently more numerous, as for instance the Sabine Gull which is now known to be a common migrant. These changes should be noted in the revised list. He also mentioned other changes such as the former breeding areas of grebes in certain sections which subsequently have been drained. It was suggested that the publishing of notes in the *Condor* would be of great help in bringing information down to date, and failing that, the sending to Mr. Willett of notes not intended for publication. An especial need was indicated in the extensions of known range, dates of breeding, migration, etc. Presi-

dent Michener expressed the hope for publication of the list in about two years if possible, and suggested that members look up their old notes as a source of valuable, unpublished information.

Mr. Miller reported seeing two flocks of egrets, Snowy and one American Egret. Mr. Michener announced that on March 13 he heard his first oriole of the season, and that young Song Sparrows were out of the nest. Mr. Appleton announced a return on a banded Red-tail at Triunfo, February, 1932. The bird was banded in April, 1929. Mr. Pemberton reported that Buena Vista and Mystic or San Jacinto lakes were dry in spite of the heavy rains.

Mrs. Law reported having heard the Spotted Owl in Altadena, and also a Barn Owl, a rather unusual occurrence in that vicinity. Mr. van Rossem reported having heard the Spotted Owl on a previous occasion in the same locality. Mr. Howard Robertson raised the question as to whether Bush-tits ever leave the foothills and wander into more open country, mentioning an article stating that they do not. In the resulting discussion it was stated that they were present in the willow groves and on the old Normal School campus in Los Angeles. Mr. Robertson also mentioned the presence of a Sparrow Hawk on Eighth Street, Los Angeles. It was always seen in the morning flying along a rather regular route, and seemed to do most of its hunting on the ledges of the May Company store. Although no English Sparrows seemed to be caught, its presence invariably stirred them to action, sometimes resulting in their pursuit of the hawk. Mr. Little mentioned the presence of Band-tailed Pigeons in the eucalyptus trees in South Pasadena, stating that they had appeared there during the past two years.

Adjourned.—R. B. COWLES, *Secretary.*

SEVENTH ANNUAL MEETING

The Seventh Annual Meeting of the Cooper Ornithological Club was held in Los Angeles, California, Friday and Saturday, April 22 and 23, 1932. The scientific sessions were held at the Los Angeles Museum in Olympic Park. Registration of members and visitors began at 9 a. m. At 10 a. m. the session was opened by Harold Michener, President of the Southern Division, who invited Dr. W. A. Bryan, Director of the Los Angeles Museum, to greet the assemblage. Director Bryan called attention to the close relationship between the Club and the Museum, and to the important part which the former played in the development of the latter. He also described briefly the efforts of the Museum to establish at Rancho La Brea an outdoor Pleistocene museum exhibition. Loye Miller, President of the Board of Governors, acknowledged Dr. Bryan's greeting.

A telegram from Stanley G. Jewett, extending wishes for the success of the meeting was read.

About fifty persons were present at the sessions on Friday morning, afternoon and evening, about sixty at each of the scientific sessions on Saturday, and approximately seventy-five at the evening dinner.

The scientific program opened with a paper by J. Grinnell, on "The first collector of birds in California—Menzies." Archibald Menzies was naturalist with Vancouver on the "Discovery" which visited the California coast in 1792 and 1793, touching at San Francisco, Point Trinidad, Tomales Bay, Monterey, Santa Barbara and San Diego. A total of ninety-six days was spent here and numerous informative observations on the bird life were recorded in his diary. The type specimens of California Condor and California Quail, the former of which is still extant in the British Museum, were taken by Menzies.

L. M. Huey discussed "Variation in nest building by the California Brown Towhee" and exhibited two contrasting examples differing in structure and bulk. The speaker concluded that the differences experienced daily by the adult birds in two diverse environments were responsible for the differences in the nests exhibited.

G. Willett spoke on "Logic in systematics," commenting on the instability in formal check-lists and certain of the seemingly unwarranted changes in generic allocation. He mentioned also the various described and undescribed forms in many groups and the question was raised as to whether all forms need to be named.

L. Miller described "A new fossil bird horizon in California," in the Monterey Temblor Miocene at San Pedro breakwater. *Puffinus diatomicus*, discovered at Lompoc, also occurs at San Pedro. It is a species similar to the present Black-vented Shearwater in size, and not distinguished by any adaptive characters from its present-day relative.

Hildegarde Howard reported "The discovery of a 'new' cormorant near Santa

Barbara," from the Veronica Springs quarry. The new species is similar to several existing cormorants but differs in various characters from all of them.

A. H. Miller described "Structural adaptations in the Hawaiian Goose" (*Nesochen*) which is now, as a species, nearly extinct in the wild but exists in small numbers in semi-captivity about human habitations. Comparisons were made with the Cackling Goose and Black Brant. The Hawaiian Goose lived originally on barren lava flows at about 5,000 feet altitude, going lower to breed and molt between September and February. It can climb and fly readily but does not swim. The musculature of the leg shows differences affording greater freedom of movement in the foot.

"The fossil storks of California" were described by L. Miller. These are relatively scarce in the LaBrea collections. Relics have been found in the LaBrea, McKittrick and Carpinteria deposits, and all are referred to one variable Pleistocene species, *Ciconia maltha*.

J. M. Linsdale discussed "Frequency of occurrence of birds in Yosemite Valley, California," using as data a series of monthly reports on birds observed by Mr. and Mrs. C. W. Michael during the past 12 years. The speaker's thesis was that frequency of observation is a criterion of value in determining the relative numbers of species.

In the evening Albert Colburn showed motion pictures of wild life of the Galapagos Islands, featuring the last field activities of the late O. W. Howard. The expedition was conducted to the islands by Mr. Willits J. Hole on his yacht "Samona" during the winter of 1928. Flightless cormorants and penguins were shown.

At the session on Saturday morning, George Willett presided. "Relations between man and birds in California" were discussed by T. I. Storer. The effect of settlements, of use of game species for food and sport, the effect of man-made changes in environment as to plant cover and agricultural plantings, and the influence of climatic pulsations were discussed. The conclusion was drawn that much area in California still retains its bird life in a relatively unmodified condition.

W. M. Pierce exhibited in motion pictures "Some Golden Eagle studies" on the Mohave Desert in California. The food included rabbits and chuckwallas to a large degree.

C. G. Abbott presented the "Closing history of the Guadalupe Caracara with a list of the known skins." Thirty-four skins of this extinct species have been located in various museums. Of these three are in the San Diego Museum of Natural History and most of the others are in collections in the eastern United States.

S. S. Stansell showed "Some birds of Kern County, California," in motion pictures and lantern slides.

"Classification of botanical areas as a basis for the study of birds in Natal, South Africa," by R. B. Cowles, afforded an interesting picture of bird habitats and the criteria used in determining these.

"A summary of the birds of Tiburon Island" by A. J. van Rossem, included the findings of earlier collectors and the results of a recent expedition by the speaker. Of the eighty-two species recorded from the island, which is in the Gulf of California, six are endemic and affinities are indicated with the fauna of the Colorado Desert.

C. G. Abbott presided at the afternoon session, which began with "Molt studies of the Phainopepla," by A. H. Miller. All spring-grown body feathers of male first-year birds are black. Birds in the coastal area show more immature brown than those of the Colorado Desert. Much variation is seen in the degree of replacement of flight feathers, especially during the first year of life. The paper gave a rational interpretation for the degree of difference observed in various birds of immature status. The relation between gonad secretions and immaturity of plumage was suggested.

R. C. Ross in "Preliminary remarks on post-breeding vertical migration in some Sierran birds," described studies at Huntington Lake in Fresno County, California. His material included various species of strictly Upper Sonoran status at nesting time, and also comment on local movement among Blue-fronted Jays which concentrate in high-zone willow thickets during August. The greatest population of birds was noted in July.

J. L. Partin presented "A year's record of House Finch weights," including 1000 weights of 800 individuals trapped and weighed in Los Angeles County. From April to July females are heavier than males; from July to November the sexes are of equal weight, and relatively light, while from December to February all birds in Los Angeles are heavier than those from Pasadena!

Fig. 22. ALFRED W. ANTHONY, FRANK STEPHENS, AND CLARK P. STREATOR, IN ATTENDANCE UPON THE SEVENTH ANNUAL MEETING OF THE COOPER ORNITHOLOGICAL CLUB AT LOS ANGELES, APRIL 22 AND 23, 1932.
Photo by Dr. John A. Comstock, of the Los Angeles Museum.

In connection with numerous studies carried on by Mr. and Mrs. Harold Michener, one paper presented "Some inferences from seven years' banding records." The growth of plant cover and increase of leafy débris on the grounds of their residence raised notably the population of San Diego Towhees. Of 205 Arizona Hooded Orioles, banded in seven years, only five birds returned in successive years, abutilon blossoms proving a special attraction. A Troupial was captured on June 16, 1928. A second paper, on "Colors induced in male House Finches by repeated feather removals," presented results from repeated plucking of the rump feathers of a male California Linnet. In three years, nineteen growths of feathers on this bird were matched with Ridgway's "Standards"; a program of change from red to greyish or brownish olive was observed.

J. McB. Robertson described "An unusual nesting site of the Black-chinned Hummingbird," which was on a loop of rope in a garage.

On Saturday evening, approximately seventy-five members and guests assembled at the Elite Tea Room, 7th and Alvarado

Streets, Los Angeles, for dinner. Loye Miller performed the duties of toastmaster in his usual inimitable style and called on various persons.

Joseph Grinnell discussed the California State bird list and indicated some of the problems involved in revising such a list. George Willett spoke briefly. The veteran naturalist, Frank Stephens, gave a vivid account of personal experiences during his youth with the now extinct Passenger Pigeon in Michigan and Illinois. Mrs. Lila Lofberg, who had traveled thirty-one miles over snow from Florence Lake in the high Sierra to attend the meeting, described experiences with her birds, and also with three coyotes which have been about her residence this winter. C. G. Abbott described the new building of the San Diego Society of Natural History, for which Harlan Edwards is the Superintendent of Construction. L. B. Bishop responded briefly, and W. L. Chambers told of the early history of bird clubs in southern California. Howard Robertson followed with comments on predecessors of the Cooper Club, and then described the activities of himself and W. M. Bowen, which led to the establishment of the Los Angeles Museum. His talk brought out again the intimate relation between the history of the Museum and that of the Club. W. M. Pierce spoke briefly, as did the Secretary. Toastmaster Miller closed the evening with an appeal to members to realize that the changing status of things regarding birds is but a part of the order of change in the world generally.—TRACY I. STORER, *Secretary.*

GOVERNORS' MEETING

The Eleventh Annual Meeting of the Board of Governors of the Cooper Ornithological Club was held at Hollywood, California, on April 24, 1932. The Board was entertained at breakfast at the residence of Dr. and Mrs. Guy C. Rich, 1820 El Cerrito Place, by Mrs. Rich and her family. The business session convened at 10 a. m. with President L. Miller in the chair, and the following members present: Mrs. H. W. Grinnell, Messrs. J. S. Appleton, L. B. Bishop, W. L. Chambers, R. B. Cowles, J. Grinnell, Harry Harris, J. M. Linsdale, Harold Michener, W. M. Pierce, G. C. Rich, Howard Robertson, J. McB. Robertson, T. I. Storer, and George Willett. The following proxies were at hand: Mrs. Amelia S. Allen, Messrs. W. K. Fisher, Joseph Mailliard and J. G. Tyler by J. Grinnell; G. M. Wright by L. Miller; H. C. Bryant, H. W. Carriger, Joseph Dixon, C. B. Lastreto, W. H. Osgood and Curtis Wright by T. I. Storer. The following were present as visitors by invitation: Mrs. W. L. Chambers, Messrs. C. G. Abbott, Luther Little, A. H. Miller and A. J. van Rossem.

Minutes of the Tenth Annual Meeting were read and approved.

Joseph Grinnell rendered a verbal report of editorial activities.

Report of the special committee appointed at the Tenth Meeting to audit the Business Manager's Report for the fiscal year ending December 31, 1930, had been transmitted under date of March 25, 1932, by Chairman C. B. Lastreto. The report was read, and, upon motion by Howard Robertson, seconded by G. C. Rich, received and placed on file and the committee discharged. Recommendations of the Special Auditing Committee were next discussed and the following motions put and carried: (1) That at least one member of future auditing committees be selected from the territory of the Southern Division (Storer, Harris); (2) that an auditing committee be appointed by the President of the Board, to audit the reports for 1931 and for 1932 (Howard Robertson, Bishop); (3) that the recommendation to transfer supervision of the investments of the Club to a trust organization be not followed (Pierce, Harris). President Miller appointed as a committee to conduct the 1931 and 1932 audits, Howard Robertson, Chairman; Harry Harris and J. S. Cooper.

Report of the Business Managers for 1931 was offered and commented upon by J. McB. Robertson. On motion by Harold Michener, seconded by G. C. Rich, the report for 1931 was received and placed on file. W. L. Chambers gave an informal statistical and financial report on the publication of the various Pacific Coast Avifaunas. General discussion followed.

The Secretary suggested that henceforth a synopsis of the Business Managers' report could be circulated with the call for the Annual Meeting of the Board.

Howard Robertson discussed the work of the committee appointed earlier to consider incorporation under the laws of California. Upon motion by G. C. Rich, seconded by W. L. Chambers, the Board voted to discharge the old incorporation committee, with thanks for service rendered,

and to establish a new committee to consider further the advisability of incorporation. Following nominations from the floor the new committee was constituted of Howard Robertson, Chairman; W. L. Chambers, J. S. Cooper, J. McB. Robertson, and G. M. Wright.

A committee on resolutions, appointed by the President, and consisting of Harold Michener, Chairman, Harry Harris and J. M. Linsdale, offered the following resolutions in appreciation of the services rendered by the Los Angeles Museum in connection with the Seventh Annual Meeting:

"The Los Angeles Museum, its Director and staff have aided immeasurably the Cooper Ornithological Club in its Seventh Annual Meeting by most generously extending to the Club its ample facilities for such a group meeting. Therefore, be it resolved that

"The Board of Governors of the Cooper Ornithological Club extends its sincere thanks to the Los Angeles Museum, and be it further resolved, that the Secretary send a copy of this resolution to the Director of the Museum."

The committee offered a second resolution respecting the three members of the Board, Donald R. Dickey, J. Eugene Law, and G. Frean Morcom, whose deaths have occurred during the last year.

The premature passing of Donald R. Dickey, on April 15, 1932, has deprived the Board of Governors of the Cooper Ornithological Club and the Club itself of one of its most influential members. A man of great ability, of great personal charm and with incipient plans of enormous value to the future of the Club, his untimely illness and death have left a gap which cannot be filled. His generosity in gathering members at his home to meet men of note from parts afar and his policy of bringing the younger men into these meetings, together with the multitudinous other services he has rendered the Club, have made a lasting impression. Be it therefore

Resolved, that the Board of Governors of the Cooper Ornithological Club hereby express its deep sorrow because of the loss of this valued member and its keen appreciation of the great benefit his life has been to the science of ornithology, to the Board of Governors, to the Club and to the individual members. Be it further

Resolved, that the Secretary be instructed to transmit a copy of these resolutions, with the sincere sympathy of the Board of Governors, to Mrs. Dickey.

In the death of J. Eugene Law on November 14, 1931, the Board of Governors of the Cooper Ornithological Club has lost a member of greatest influence. As an officer of the Southern Division from 1905 to 1917, as one of the Business Managers of the Club from 1907 to 1925, and as the first President of the Board of Governors, in the formation of which he was foremost, he took a leading part in the official life of the Club. With unremitting effort he directed the Club's activities toward scientific ornithology. His own ornithological work was an inspiration to those who were privileged to view it and it is a matter of deep regret that his strength was too much curtailed to allow the completion of much of the work for which he planned to the very end. Be it therefore

Resolved, that the Board of Governors of the Cooper Ornithological Club hereby express its deep sorrow because of the loss of this valued member and its keen appreciation of the great benefit his life has been to the science of ornithology, to the Board of Governors, to the Club and to the individual members. Be it further

Resolved, that the Secretary be instructed to transmit a copy of these resolutions, with the sincere sympathy of the Board of Governors, to Mrs. Law.

The death of G. Frean Morcom, on March 25, 1932, has taken from the Cooper Ornithological Club one of its staunchest supporters. From the very beginning of the Southern Division, although not a member until 1905, he rendered substantial aid to the Club and to individual members. For years his home was a rendezvous where his own great interest in collecting and [illegible]ge collections of skins and eggs added immeasurably to the enthusiasm of the members. As President he served the Southern Division from 1907 to 1912. His large collection of skins and enormous collection of eggs are now of surpassing historical interest. Be it therefore

Resolved, that the Board of Governors of the Cooper Ornithological Club hereby express its deep sorrow because of the loss of this valued member and its keen appreciation of the great benefit that his life has been to the Board of Governors, the Club and the individual members. Be it further

Resolved that the Secretary to instructed to transmit a copy of these resolutions, with the sincere sympathy of the Board of Governors, to his family.

The committee further proposed a vote of thanks to Mrs. and Dr. G. C. Rich for their courtesy in entertaining the Board at this meeting. These resolutions were accepted unanimously; and upon the suggestion of the President, a standing vote was offered in appreciation of the several services to the Club rendered by the deceased members.

Upon opening nominations for officers for the ensuing year, a motion by L. B. Bishop, seconded by Howard Robertson, directed that a ballot be cast reelecting the current officers. Carried. The officers for the ensuing year are: Board of Governors, President, L. H. Miller; Vice-president, Joseph Mailliard; Secretary, T. I. Storer. Editor, Joseph Grinnell; Associate Editor, J. M. Linsdale. Business Manager W. L. Chambers; Associate Business Manager, J. McB. Robertson. Editor Joseph Grinnell then nominated as an additional associate editor for *The Condor*, Alden H. Miller; upon motion by Howard Robertson, seconded by George Willett, the nomination was confirmed unanimously.

Harry Harris discussed the activities of the endowment secretary, and the work which he had performed in closing up previous activities of that office. C. G. Abbott discussed the likelihood of the San Diego group offering an invitation for the Annual Meeting of 1934. The visitors present were invited to contribute to the program, and each spoke briefly on the work of the Club.

Discussion of the matter of electing honorary members to the Club was initiated by J. Grinnell, and participated in by various members. Adjourned at 12:40 p. m.
—TRACY I. STORER, *Secretary*.

For Sale, Exchange and Want Column.—Any Cooper Club member is entitled to one advertising notice in each issue free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN McB. ROBERTSON, Buena Park, California.

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